WORK PLAN

FOR

WATERSHED PROTECTION, FLOOD PREVENTION, AND DRAINAGE

BAYOU PLAQUEMINE BRULE WATERSHED

Acadia and St. Landry Parishes, Louisiana

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
Washington, D. C. 20250

SUBJECT: WS-PL 566 - Bayou Plaquemine Brule Watershed, Louisiana

DATE: NOV 4 1975

TO: Alton Mangum
State Conservationist, SCS
Alexandria, Louisiana

The watershed work plan for the Bayou Plaquemine Brule Watershed, Acadia and St. Landry Parishes, Louisiana, has been approved by resolution adopted by the Committee on Agriculture and Forestry of the Senate on October 1, 1975, and by the Committee on Agriculture of the House of Representatives on October 29, 1975.

Until the limitation on construction starts is removed, no WF-08 funds may be used for any purpose on this watershed.

Subject to the foregoing, you are authorized to provide federal assistance in the installation of works of improvement on the Bayou Plaquemine Brule Watershed in accordance with the terms, conditions, and stipulations contained in the work plan when funds appropriated for this purpose are made available.

Please submit a field cost estimate SCS-WS-207 report in accordance with WPH 116.02. Show no funds expended in fiscal year 1976. Be sure to show the officially designated project code number on the line with the project name.

Norman A. Berg Acting
R. M. Davis
Administrator

WATERSHED WORK PLAN

BAYOU PLAQUEMINE BRULE WATERSHED

St. Landry and Acadia Parishes, Louisiana

Prepared under the Authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83d Congress, 68 Stat. 666) as amended

Prepared by:

Acadia Soil and Water Conservation District
St. Landry Soil and Water Conservation District
Acadia Parish Police Jury
St. Landry Parish Police Jury
Sixth Ward and Crowley Drainage District
Iota-Long Point Gravity Drainage District
Egan Drainage District No. 1
Ward 1 Gravity Drainage District No. 2
Second Ward Gravity Drainage District No. 2
Bayou Plaquemine Gravity Drainage District No. 12
Second Ward Gravity Drainage District No. 1
Bayou Plaquemine-Wikoff Gravity Drainage District
Fourth Ward Gravity Drainage District No. 1
Bayou Plaquemine and Mallet Gravity Drainage District No. 10
Fifth Ward Gravity Drainage District No. 1

With assistance by:

United States Department of Agriculture
Soil Conservation Service
Forest Service

United States Department of the Interior
Fish and Wildlife Service

State of Louisiana
Wild Life and Fisheries Commission
Department of Public Works

April 1975

BAYOU PLAQUEMINE BRULE WATERSHED

Louisiana

ADDENDUM

to the

WATERSHED WORK PLAN

Phase-In of Principles and Standards for
Planning Water and Related Land Resources

April 1975

BAYOU PLAQUEMINE BRULE WATERSHED

LOUISIANA

CONTENTS OF ADDENDUM

SECTION 2

SELECTED ALTERNATIVE
NATIONAL ECONOMIC DEVELOPMENT ACCOUNT
Bayou Plaquemine Brule Watershed, Louisiana

Components	Measures of Effects[a/] (dollars)
The value to users of increased outputs of goods and services	
Beneficial effects:	
A. Flood prevention	$1,017,850
B. Drainage	780,950
C. Utilization of unemployed and underemployed labor resources	
1. Project construction	37,100
2. Operation, Maintenance, Replacement	11,400
Total beneficial effects	$1,847,300
The value of resources required for a plan	
Adverse effects:	
A. Channel work with appurtenant structures	
1. Project installation	265,000
2. Project administration	39,200
3. Operation, Maintenance, Replacement	87,000
Total adverse effects	391,200
Net beneficial effects	$1,456,100

a/ Average annual

SECTION 2

SELECTED ALTERNATIVE
REGIONAL DEVELOPMENT ACCOUNT
Bayou Plaquemine Brule Watershed, Louisiana

Components	Measures of Effects[a/] State of Louisiana	Rest of Nation
	----------(dollars)----------	
A. Income		
Beneficial effects:		
1. The value of increased output of goods and services to users residing in the region		
a. Flood prevention	$1,017,850	-
b. Drainage	780,950	-
c. Utilization of unemployed and underemployed labor resources		
1) Project construction	37,100	-
2) OM&R	11,400	-
d. Secondary	213,500	-
Total beneficial effects	$2,060,800	
Adverse effects:		
1. The value of resources contributed from within the region to achieve outputs		
a. Single and multiple purpose flood prevention and drainage channel work		
1) Project installation	$ 106,400	$ 158,600
2) Project administration	2,100	37,100
3) OM&R	87,000	-
Total adverse effects	195,500	195,700
Net beneficial effects	$1,865,300	$ -195,700
B. Employment		
Beneficial effects:		
1. Increase in number and types of jobs		
a. Employment for project construction	185 semi-skilled jobs over a 10-year period	-
b. Employment for project OM&R	4 semi-skilled permanent jobs for 50 years	-
Total beneficial effects	185 semi-skilled jobs over a 10-year period 4 semi-skilled permanent jobs per year for 50 years	-
Adverse effects:		
1. Decrease in number and types of jobs	-	-
Total adverse effects	-	-
Net beneficial effects	185 semi-skilled jobs over a 10-year period 4 semi-skilled permanent jobs for 50 years	-

a/ Average annual

SECTION 2

SELECTED ALTERNATIVE
REGIONAL DEVELOPMENT ACCOUNT (cont.)
Bayou Plaquemine Brule Watershed, Louisiana

Components	Measures of Effects[a/] State of Louisiana	Rest of Nation
C. Population Distribution		
Beneficial effects:	The number of rural residents decreased by 4.4 percent from 1960 to 1970. The increased annual average farm income of about $900 per farm should help slow the trends of decreasing number of farms and out-migration. The project will create a need for 185 semi-skilled jobs over 10 years and 4 semi-skilled permanent jobs for 50 years in an area which had a net out-migration of 21,398 persons.	---
Adverse effects:	---	---
D. Regional Economic Base and Stability		
Beneficial effects:	The project will provide a 33-percent level of protection to 11,600 acres of cropland and pastureland which will reduce flooding and improve drainage. In addition, the project will also provide a 1-percent level of protection to the town of Church Point which will reduce flooding. As a result of the above, average annual net income will increase by $900 per farm, and urban flood damages will be reduced by $38,100. There will be 385 semi-skilled jobs created over 50 years in the project area, which has been classified by the Economic Development Administration as a Title IV area because of severely depressed economic conditions. Flood protection and improved drainage are integral parts of increased farm productivity and improved urban life in the project area.	---
Adverse effects:	---	---

a/ Average Annual

SECTION 2

SELECTED ALTERNATIVE
ENVIRONMENTAL QUALITY ACCOUNT
Bayou Plaquemine Brule Watershed, Louisiana

Components	Measures of Effects
Beneficial and adverse effects:	
A. Areas of Natural Beauty	1. The project will accelerate the establishment of conservation measures which will protect and improve the environment.
	2. Shaping and revegetation of the spoil and revegetation of the berms will make the channels more aesthetically pleasing. Plants with wildlife and aesthetic value will be used to revegetate these areas.
	3. Aesthetic resources may be affected in the 19 miles of channel to be worked through forest land and 34 miles through open land where woody vegetation grows along the banks. Trees inside the channel may be aesthetically pleasing because of unique characteristics of size, form, color, leaf texture, bark, flowers, or fruits. Efforts will be made to preserve as many of these trees as possible, but some will have to be destroyed.
	4. The project will greatly reduce standing water over yards and lawns in the town of Church Point.
	5. The project will enable the community of Church Point to establish a community-wide beautification project.
B. Quality considerations of water, land, and air pollution	1. Erosion and the resulting sedimentation and turbidity will decrease after project installation, thereby improving water quality.
	2. Turbidity and suspended solids concentration in waters immediately downstream from channel construction will increase temporarily at times during construction.
	3. Water temperature will increase slightly because of vegetative removal.
	4. The establishment of land treatment practices will reduce erosion and sediment rates which will, in turn, reduce the hazardous effects on fish and wildlife caused by slight increases in pesticide usage.

SECTION 2
SELECTED ALTERNATIVE
ENVIRONMENTAL QUALITY ACCOUNT (cont.)
Bayou Plaquemine Brule Watershed, Louisiana

Components	Measures of Effects
Beneficial and adverse effects:	
C. Biological resources and selected ecosystems	1. Removal of cover, potholes, and areas of attachment for benthic organisms and phytoplankton will result in the biological productivity being lowered slightly.
	2. As a result of project installation, forest land will be reduced from 25,100 acres to 25,010 acres. This will be a loss from the forest ecosystem of 90 acres. This loss will adversely affect forest wildlife species such as deer, squirrels, wood ducks, woodcock, swamp rabbits, and some nongame species.
	3. Converting land to spoil and berms will not be detrimental to rabbits and many other species. The stages of natural plant succession that will develop along the spoil provide excellent habitat for these animals.
	4. Open land species will be benefited by project action because of increases in open land habitat.
	5. Seven structures for water control (weirs) will be installed. These structures will create 37 acres of ponded water which will in crease both fish and wildlife habitat.
	6. Fish production is expected to increase by 15 pounds of fish per acre as a result of the weirs.
	7. The ponded water behind the weirs will also provide an increase in aquatic habitat for amphibians, reptiles, and wading birds.
	8. Thirty-four acres of spoil will be planted with hardwood seedlings. These will include, depending on soil type and availability, water oak, pecan, willow oak, sawtooth oak, and other desirable species.
D. Historical, Archaeological, and Geological	1. No known archaeological or historical sites will be disturbed.

SECTION 2

SELECTED ALTERNATIVE
ENVIRONMENTAL QUALITY ACCOUNT (cont.)
Bayou Plaquemine Brule Watershed, Louisiana

Components	Measures of Effects
Beneficial and adverse effects:	
E. Irreversible or Irretrievable Commitment	1. About 37 acres of land within ephemeral, intermittent, and ponded channels will be committed to permanent water for at least the life of the project.
	2. Commitment of 1,928 acres of land for channel, spoil placement, and berms for ingress and egress of maintenance equipment will be binding for at least the project life.

SECTION 2

SELECTED ALTERNATIVE
SOCIAL WELL-BEING ACCOUNT
Bayou Plaquemine Brule Watershed, Louisiana

Components	Measures of Effects
Beneficial and adverse effects:	
A. Life, health, and safety	1. The project will have a significant influence upon the life, health, and safety of the watershed residents. Reductions in the time of peak stages reached by out-of-bank flow over roads and streets will result in uninterrupted farming operations and commuting of local residents to jobs and other normal day-to-day activities. In the same light, school bus routes will no longer have to be delayed or omitted, thereby reducing flood-related absenteeism. Flooded roads and streets will no longer present a problem to emergency vehicles in the event that they are required.
	2. The project will prevent the materialization of health hazards associated with, water standing in yards and under houses, undesirable odors from stagnated water around dwellings, and wading in water to get to and from dwellings.
	3. The possibility of a life-endangering industrial explosion, resulting from flooding, will no longer exist.
B. Educational, Cultural, and Recreational	---

SECTION 3

ENVIRONMENTAL QUALITY PLAN
(Abbreviated)

ENVIRONMENTAL PROBLEMS

Frequent flooding aggravated by poor drainage causes environmental problems in the growth of plants and animals essential to the production of food and fiber. These agricultural crops and animals are rice, soybeans, cotton, corn, sweet potatoes, pasture grasses, and cattle. For the most part, none of these biological species are extremely tolerant to water. Rice would be the closest exception, but it too is affected. Prolonged uncontrolled water can stunt their normal growth or destroy them entirely. Cattle are also affected because they depend upon the grasses grown for pasture for food. If these grasses are harmed by excess water, cattle growth and development are also affected. Lack of proper growth and development are also affected. Lack of proper growth and development of these biotic organisms are environmentally limiting. This is manifested in the fact that these plants and animals, even though they are domestic, serve a useful purpose to their related ecosystems. If they cannot reach their full potential, then their value to the ecosystem will not be realized. Use of the energy required to produce these plants and animals (foods and fibers) can be justified only if it is used in an efficient manner. Otherwise, the energy will have been needlessly allocated to these plants and animals.

Environmentally degrading conditions that exist in Church Point and Crowley are attributable to flooding and/or poor drainage. Severe wetness and frequent flooding are conducive to water standing in yards and under houses resulting in odors which are very offensive. These areas also serve as mediums for development of vectors which are harmful to humans. The combination of the above elements serves to mar the natural and planned aesthetic beauty of these communities, hereby reducing the overall value of these communities to society as a whole. Flooding in this watershed also creates a potential for loss of life.

Fish habitat problems in the project area are attributable to poor water quality, limited quantities of water suitable to sustain a productive fishery; lack of and difficulty in proper management and rather poor access to the existing waters areas. The poor water quality is caused primarily by high concentrations of suspended solids and plant macro-nutrients, high color and turbidity, and probably

contamination by pesticides. However, this problem is also linked to the lack of convenient and efficient solid waste disposal systems and public awareness of the detrimental effects of dumping solid waste into the watercourses. When flooding occurs this waste is dispersed over the land, resulting in aesthetic pollution of the watershed environment. The nearly level topography and intensive land use limit the potential for new impoundments to provide additional fish habitats.

The open land wildlife populations are below the potential carrying capacity of the area, which is directly attributable to the lack of protective cover, especially in winter; lack of suitable nesting habitat; and probably increasing usage of pesticides. Overgrazed and underfertilized pasture provide rather poor habitat for most open land wildlife. There are insufficient amounts of quality forest habitat available for wildlife in the project area.

Soil loss resulting from sheet erosion causes sedimentation of channels and fisheries in the area, which reduces their effectiveness. Adaptation of the rice-soybeans rotation in lieu of the rice-pasture rotation in the watershed has served to expose more soil to the high direct precipitation and has increased erosion.

There is a lack of all types of recreational facilities within a 30-mile radius of the watershed. This is especially true for water-based recreation. The main reason for this is that there are below-average qualities and quantities of water available for fishing and water sports.

There are approximately 380 miles of gravel and dirt roads in the watershed. These roads become sources of air pollution when droughty conditions prevail. When these roads are used, the dust becomes airborne, thus polluting the air with soil particles. Residents along these roads have to take precautions to keep this dust out of their dwellings, automotive vehicles, storage sheds, etc. Many of these people have outdoor clotheslines, and there is nothing to keep their laundry from getting soiled after washing. The aesthetics of the vegetation growing along these roads is defaced by the accumulated dust.

COMPONENT NEEDS

The environmental quality component needs of the watershed are to reduce flooding and improve drainage, reduce erosion, improve fish habitat and access to these areas, improve wildlife habitat, improve water quality, reduce dumping of solid waste in and along channels,

reduce dust pollution (air) from roads, and increase the number of available recreational facilities.

PLAN ELEMENTS

Elements Which Would Be Installed Under PL-566

A complete conservation land treatment program on 124,000 acres of cropland, pastureland, and "other land" will be established during the installation period. The remainder of the land in the watershed will have some conservation land treatment measures installed. Land treatment consisting primarily of conservation cropping system, crop residue management, drainage mains and laterals, pasture and hayland management, pasture and hayland planting, structures for water control, irrigation land leveling, wildlife wetland habitat management, and wildlife upland habitat management will be installed at a cost of about $3,349,300.

Two hundred twenty-three miles of channels will be altered and modified to reduce flooding and improve drainage at a cost of about $5,057,500. This work would be done in a manner which would minimize damages to fish and wildlife.

The total installation cost of these plan elements would be about $8,406,800.

Elements Which Would Be Installed Under Institutional Arrangements Other Than PL-566

Access to existing fishing areas would be installed to provide increased public use of these areas. This access would be provided by State and local highway departments in cooperation and outdoor recreational development organizations.

Increased control over and monitoring of the type of agricultural chemicals being applied by landowners and users would be necessary. This would be done by all Federal and State agencies (i. e., Environmental Protection Agency) responsible for regulating such use.

Passing and enforcing ordinances would be necessary to reduce the problems of improper trash dumping. Signs would be placed at all locations of definite improper dumping stating that it is forbidden by law. Existing trash would be removed and sanitary dumps established at locations well-suited for that purpose. Coupled with this would be a public awareness campaign designed to alert the general public to

the detrimental effects of careless discarding of solid wastes. Passage and enforcement of the ordinances would be the responsibility of the local residents, and the public awareness campaign would be handled by utilization of the mass media.

Hard surfacing of approximately 380 miles of gravel and dirt roads would reduce dust and air pollution. This would be done by private road owners, the Louisiana Department of Highways, and responsible State and parish organizations. The cost of doing this work would be about $6,840,000.

Improved forest land and woodland management practices would be adopted to preserve existing forest land and to improve the wildlife habitat in those areas. This would be accomplished by the appropriate departments of the Louisiana Forestry Commission in cooperation with landowners.

Installation of 1,992 tent camping sites, 1,239 trailer camping sites, 2,168 picnicking sites, and 492 boating ramps would meet recreation needs within a 30-mile radius of the watershed. This would be accomplished by private individuals and the responsible State and local agencies charged with the responsibility of developing outdoor recreation facilities.

ENVIRONMENTAL EFFECTS

Areas of Natural Beauty

Installation of structural measures will temporarily bare the soil in construction areas. Planting of grasses and trees on these areas soon after construction is complete will reestablish vegetation.

Improved drainage and reduced flooding in residential areas would enhance the landscape. Shrubs and grasses would be healthier, and debris deposition would be reduced. This will also allow better, more uniform growth of crops and grasses, presenting a more pleasing scenic view of the watershed.

Removal of existing trash and litter and prevention of any further dumping would improve the aesthetics of the landscape in the vicinity of channels. The elimination of dust from gravel and dirt roads would eliminate the deposition of dust on grass, shrubs, automobiles, clothing, and buildings, thus presenting a cleaner, more pleasing appearance.

Quality Consideration of Water, Air, and Land Resources

Reduced flooding and better drainage will allow efficient use of natural resources presently committed to the production of food and

fiber. A decrease in the number of replantings and the elimination of extra cultural practices would be conducive to conservation of fuel and seed and reduce usage of agricultural chemicals. Odors and vector hazards resulting from stagnated water after flooding would be eliminated.

The application of land treatment measures will reduce erosion from 4.9 tons per acre per year to 4.4 tons per acre per year, which will conserve soil and reduce water turbidity. Present and projected land use was utilized in the analyses. Installation of structures for water control (weirs) will increase water areas by about 33 acres. Hard surfacing roads would reduce air pollution.

Turbidity would temporarily increase during project construction. Sediment generated by construction and delivered to Bayou Des Cannes would amount to 2,167 tons per year for 6 years. About 654 acres of open land, 96 acres of wooded channel banks, and 90 acres of forest land not presently occupied by channels will be temporarily disturbed by the project.

Construction of roads to the less accessible areas will make them more accessible for recreation.

Biological Resources and Selected Ecological Systems

The food chain of aquatic population will be disrupted temporarily during construction. Approximately 76 acres of rabbit habitat will be converted to channels. Deer and squirrel populations will be reduced by the loss of 90 acres of forest land habitat. Occasional periods of noxious aquatic weed growth will occur in the permanent pools of water.

Ponded water created by the weirs would increase the present fish habitat in channels by 33 acres. Land treatment would reduce sheet erosion by 8 percent and would improve water quality. Shallow areas of the created pools would provide habitat for wading birds.

The reduced flooding and improved drainage would improve the living conditions in residential areas. Inconveniences and unsanitary conditions caused by flooding would be reduced. Installation of better solid waste disposal systems would reduce the likelihood of water pollution from these sources.

Installation of land treatment practices for wildlife upland and wetland habitat management would improve habitat for wildlife. Woodland improvement would eliminate the poorer trees, making room for the more productive trees to grow. Under improved harvesting and management practices some of the better trees for mast production would be left.

Irreversible and Irretrievable Effects

Approximately 33 acres of land within ephemeral and intermittent flow channels would be committed to ponded water. The channel works would preclude the use of 840 acres of land for any other purposes for at least the life of the project.

Although these resources are committed for the life of the project, they are not technically irreversibly and irretrievably committed, because they could be reclaimed by more elaborate systems.

TABLE OF CONTENTS

WATERSHED WORK PLAN AGREEMENT

between the

ACADIA SOIL AND WATER CONSERVATION DISTRICT
Local Organization

ST. LANDRY SOIL AND WATER CONSERVATION DISTRICT
Local Organization

ACADIA PARISH POLICE JURY
Local Organization

ST. LANDRY PARISH POLICE JURY
Local Organization

SIXTH WARD AND CROWLEY DRAINAGE DISTRICT
Local Organization

IOTA-LONG POINT GRAVITY DRAINAGE DISTRICT
Local Organization

EGAN DRAINAGE DISTRICT NO. 1
Local Organization

WARD 1 GRAVITY DRAINAGE DISTRICT NO. 2
Local Organization

SECOND WARD GRAVITY DRAINAGE DISTRICT NO. 2
Local Organization

BAYOU PLAQUEMINE GRAVITY DRAINAGE DISTRICT NO. 12
Local Organization

SECOND WARD GRAVITY DRAINAGE DISTRICT NO. 1
Local Organization

BAYOU PLAQUEMINE-WIKOFF GRAVITY DRAINAGE DISTRICT
Local Organization

FOURTH WARD GRAVITY DRAINAGE DISTRICT NO. 1
Local Organization

BAYOU PLAQUEMINE AND BAYOU MALLET GRAVITY DRAINAGE DISTRICT NO. 10
Local Organization

FIFTH WARD GRAVITY DRAINAGE DISTRICT NO. 1
Local Organization

(hereinafter referred to as the Sponsoring Local Organization)

State of Louisiana

and the

Soil Conservation Service
United States Department of Agriculture
(hereinafter referred to as the Service)

Whereas, application has heretofore been made to the Secretary of Agriculture by the Sponsoring Local Organization for assistance in preparing a plan for works of improvement for the Bayou Plaquemine Brule Watershed, State of Louisiana, under the authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83d Congress; 68 Stat. 666) as amended; and

Whereas, the responsibility for administration of the Watershed Protection and Flood Prevention Act, as amended, has been assigned by the Secretary of Agriculture to the Service; and

Whereas, there has been developed through the cooperative efforts of the Sponsoring Local Organization and the Service a mutually satisfactory plan for works of improvement for the Bayou Plaquemine Brule Watershed, State of Louisiana, hereinafter referred to as the watershed work plan, which plan is annexed to and made a part of this agreement;

Now, therefore, in view of the foregoing considerations, the Sponsoring Local Organization and the Secretary of Agriculture, through the Service, hereby agree on the watershed work plan, and further agree that the works of improvement as set forth in said plan can be installed in about 10 years.

It is mutually agreed that in installing and operating and maintaining the works of improvement substantially in accordance with the terms, conditions, and stipulations provided for in the watershed work plan:

1. The Sponsoring Local Organization will acquire, with other than Public Law 566 funds, such land rights as will be needed in connection with the works of improvement (estimated cost, $1,090,400).

2. The Sponsoring Local Organization assures that comparable replacement dwellings will be available for individuals and persons displaced from dwellings, and will provide relocation assistance advisory services and relocation assistance, make the relocation payments to displace persons, and otherwise comply with the real property acquisition policies contained in the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646, 84 Stat. 1894) effective as of January 2, 1971 and the regulations issued by the Secretary of Agriculture pursuant thereto. The costs of relocation payments will be shared by the Sponsoring Local Organization and the Service as follows:

	Sponsoring Local Organization (percent)	Service (percent)	Estimated Relocation Payment Costs (dollars)
Relocation Payment	58.5	41.5	0 1/

1/ Investigation has disclosed that under present conditions the project measures will not result in the displacement of any person, business, or farm operation. However, if relocations become necessary, relocation payments will be cost-shared in accordance with the percentages shown.

3. The Sponsoring Local Organization will acquire or provide assurance that landowners or water users have acquired such water rights pursuant to State law as may be needed in the installation and operations of the works of improvement.

4. The percentages of construction costs of structural measures to be paid by the Sponsoring Local Organization and by the Service are as follows:

Works of Improvement	Sponsoring Local Organization (percent)	Service (percent)	Estimated Construction Cost (dollars)
Channel Work	25	75	2,712,800
Channel M-1	0	100	386,000

The Sponsoring Local Organization will provide a portion of their share of the construction cost of structural measures by furnishing all equipment, labor, and materials necessary for channel improvement of a portion of the channels to be improved. The quantity and value

of such work will be determined by mutual agreement immediately prior to the signing of the project agreement and will be set forth therein.

5. The percentages of the engineering costs to be borne by the Sponsoring Local Organization and by the Service are as follows:

Works of Improvement	Sponsoring Local Organization	Service	Estimated Construction Cost
	(percent)	(percent)	(dollars)
Channel Work	0	100	216,900

6. The Sponsoring Local Organization and the Service will each bear the costs of Project Administration which it incurs, estimated to be $34,120, and $617,280, respectively.

7. The Acadia and the St. Landry Soil and Water Conservation Districts will provide assitance to landowners and operators to assure the installation of the land treatment measures shown in the watershed work plan.

8. The Acadia and the St. Landry Soil and Water Conservation Districts will encourage landowners and operators to operate and maintain the land treatment measures for the protection and improvement of the watershed.

9. The Sponsoring Local Organization will be responsible for the operation and maintenance of the structural works of improvement by actually performing the work or arranging for such work in accordance with agreements to be entered into prior to issuing invitations to bid for construction work.

10. The costs shown in this agreement represent preliminary estimates. In finally determining the costs to be borne by the parties hereto, the actual costs incurred in the installation of works of improvement will be used.

11. This agreement is not a fund-obligating document. Financial and other assistance to be furnished by the Service in carrying out the watershed work plan in contingent on the appropriation of funds for this purpose.

A separate agreement will be entered into between the Service and the Sponsoring Local Organization before either party

initiates work involving funds of the other party. Such agreement will set forth in detail the financial and working arrangements and other conditions that are applicable to the specific works of improvements.

12. The watershed work plan may be amended or revised, and this agreement may be modified or terminated only by mutual agreement of the parties hereto except for cause. The Service may terminate financial and other assistance in whole, or in part, at any time whenever it is determined that the Sponsoring Local Organization has failed to comply with the conditions of this agreement. The Service shall promptly notify the Sponsoring Local Organization in writing of the determination and the reasons for the termination, together with the effective date. Payments made to the Sponsoring Local Organization or recoveries by the Service under projects terminated for cause shall be in accord with the legal rights and liabilities of the parties. An amendment to incorporate changes affecting one specific structural measure may be made by mutual agreement between the Service and the Sponsor having specific responsibilities for the particular structural measure involved.

13. No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this agreement, or to any benefit that may arise therefrom; but his provision shall not be construed to extend to this agreement is made with a corporation for its general benefit.

14. The program conducted will be in compliance with all requirements respecting nondiscrimination as contained in the Civil Rights Acts of 1964, and the regulations of the Secretary of Agriculture (7 C.F.R.15.1-15.12), which provide that no person in the United States shall, on the ground of race, color, or national origin, be denied the benefits of, or be subjected to discrimination under any activity receiving Federal financial assistance.

15. This agreement will not become effective until the Service has issued a notification of approval and authorizes assistance.

AGREEMENT

ACADIA SOIL AND WATER CONSERVATION DISTRICT
Local Organization

By [signature]

Title Chairman

Post Office Box 637
Crowley, Louisiana 70526
Address Zip Code

Date

The signing of this agreement was authorized by a resolution of the governing body of the Acadia Soil and Water Conservation District
Local Organization

adopted at a meeting held on 9/16/69

Secretary, Local Organization

Post Office Box 637
Crowley, Louisiana 70526
Address Zip Code

Date 4/15/75

ST. LANDRY SOIL AND WATER CONSERVATION DISTRICT
Local Organization

By Richard M. Hollier, Jr.

Title Chairman

Post Office Box 472
Opelousas, Louisiana 70570
Address Zip Code

Date 4/21/75

The signing of this agreement was authorized by a resolution of the governing body of the St. Landry Soil and Water Conservation District
Local Organization

adopted at a meeting held on 7/14/69

Nick D. Dubroesson
Secretary, Local Organization

Post Office Box 472
Opelousas, Louisiana 70570
Address Zip Code

Date 4/21/75

AGREEMENT

ACADIA PARISH POLICE JURY Local Organization	By Aaron Cart
Courthouse Building Crowley, Louisiana 70526 Address Zip Code	Title President Date 4/11/75

The signing of this agreement was authorized by a resolution of the governing body of the Acadia Parish Police Jury
Local Organization
adopted at a meeting held on 9/3/69

Secretary, Local Organization	Courthouse Building Crowley, Louisiana 70526 Address Zip Code

Date 4/11/75

ST. LANDRY POLICE JURY Local Organization	By
Post Office Box 551 Opelousas, Louisiana 70570 Address Zip Code	Title President Date 4/21/75

The signing of this agreement was authorized by a resolution of the governing body of the St. Landry Police Jury
Local Organization
adopted at a meeting held on 8/4/69

Gerry Pellen Secretary, Local Organization	Post Office Box 551 Opelousas, Louisiana 70570 Address Zip Code

Date 4/21/75

AGREEMENT

SIXTH WARD AND CROWLEY DRAINAGE DISTRICT
Local Organization

By Lidy L Broussard

Title President

1206 North Avenue J
Crowley, Louisiana 70526
Address Zip Code

Date 4/11/75

The signing of this agreement was authorized by a resolution of the governing body of the Sixth Ward and Crowley Drainage District
Local Organization

adopted at a meeting held on 8/4/69

Secretary, Local Organization

1206 North Avenue J
Crowley, Louisiana 70526
Address Zip Code

Date 4/11/75

IOTA-LONG POINT GRAVITY DRAINAGE DISTRICT
Local Organization

By John Thevis

Title President

Post Office Box 5
Iota, Louisiana 70543
Address Zip Code

Date 4/15/75

The signing of this agreement was authorized by a resolution of the governing body of the Iota-Long Point Gravity Drainage District
Local Organization

adopted at a meeting held on 9/15/69

Secretary, Local Organization

Post Office Box 5
Iota, Louisiana 70543
Address Zip Code

Date 4/15/75

EGAN DRAINAGE DISTRICT
NO. 1
Local Organization

By [signature]

Title President

Post Office Box 136
Egan, Louisiana 70531
Address Zip Code

Date 4/16/75

The signing of this agreement was authorized by a resolution of the governing body of the Egan Drainage District No. 1
Local Organization

adopted at a meeting held on 9/10/69

[signature]
Secretary, Local Organization

Post Office Box 136
Egan, Louisiana 70531
Address Zip Code

Date 4/11/75

WARD 1 GRAVITY DRAINAGE
DISTRICT NO. 2
Local Organization

By Elton Dupont

Title President

405 Stadium Drive
Rayne, Louisiana 70578
Address Zip Code

Date 4/9/75

The signing of this agreement was authorized by a resolution of the governing body of the Ward 1 Gravity DrainageDistrict No. 2
Local Organization

adopted at a meeting held on 8/15/69

[signature]
Secretary, Local Organization

405 Stadium Drive
Rayne, Louisiana 70578
Address Zip Code

Date 4/9/75

AGREEMENT

SECOND WARD GRAVITY DRAINAGE DISTRICT NO. 2
Local Organization

By Walter W. Bruner

Title President

108 South Adams Street
Rayne, Louisiana 70578
Address Zip Code

Date 4/10/75

The signing of this agreement was authorized by a resolution of the governing body of the Second Ward Gravity Drainage District No. 2
Local Organization

adopted at a meeting held on 8/11/69

Simon Hulin
Secretary, Local Organization

108 South Adams Street
Rayne, Louisiana 70578
Address Zip Code

Date 4/17/75

BAYOU PLAQUEMINE GRAVITY DRAINAGE DISTRICT NO. 12
Local Organization

By Louis Burleigh

Title President

Route 1, Box 120
Opelousas, Louisiana 70570
Address Zip Code

Date 4/21/75

The signing of this agreement was authorized by a resolution of the governing body of the Bayou Plaquemine Gravity Drainage District No. 12
Local Organization

adopted at a meeting held on 8/25/69

Secretary, Local Organization

Route 1, Box 120
Opelousas, Louisiana 70570
Address Zip Code

Date 4/21/75

SECOND WARD GRAVITY DRAINAGE DISTRICT NO. 1
Local Organization

By Noah Logan

Title President

108 South Adams Street
Rayne, Louisiana 70578
Address Zip Code

Date 4/17/75

The signing of this agreement was authorized by a resolution of the governing body of the Second Ward Gravity Drainage District No. 1
Local Organization

adopted at a meeting held on 8/14/69

Secretary, Local Organization

108 South Adams Street
Rayne, Louisiana 70578
Address Zip Code

Date 4/17/75

BAYOU PLAQUEMINE-WIKOFF GRAVITY DRAINAGE DISTRICT
Local Organization

By

Title President

237 North Broadway Street
Church Point, Louisiana 70525
Address Zip Code

Date 4/10/75

The signing of this agreement was authorized by a resolution of the governing body of the Bayou Plaquemine-Wikoff Gravity Drainage District
Local Organization

adopted at a meeting held on 9/12/69

Secretary, Local Organization

237 North Broadway Street
Church Point, Louisiana 70525
Address Zip Code

Date 4/10/75

AGREEMENT

FOURTH WARD GRAVITY DRAINAGE
DISTRICT NO. 1
Local Organization

Route 1, Box 187
Iota, Louisiana 70543
Address Zip Code

By

Title President

Date 4/16/75

The signing of this agreement was authorized by a resolution of the governing body of the Fourth Ward Gravity Drainage District No. 1
Local Organization

adopted at a meeting held on 11/11/69

Secretary, Local Organization

Date 4/11/75

Route 1, Box 187
Iota, Louisiana 70543
Address Zip Code

BAYOU PLAQUEMINE AND BAYOU
MALLET GRAVITY DRAINAGE
DISTRICT NO. 10
Local Organization

Star Route, Box 7
Washington, Louisiana 70589
Address Zip Code

By Sidney Sylvester

Title President

Date 4/21/75

The signing of this agreement was authorized by a resolution of the governing body of the Bayou Plaquemine and Bayou Mallet Gravity Drainage District No. 10
Local Organization

adopted at a meeting held on 7/31/69

Secretary, Local Organization

Date 4/21/75

Star Route, Box 7
Washington, Louisiana 70589
Address Zip Code

AGREEMENT

FIFTH WARD GRAVITY DRAINAGE
DISTRICT NO. 1
Local Organization

By ______________________

Title President

Post Office Box 108
Estherwood, Louisiana 70534
Address Zip Code

Date ______________________

The signing of this agreement was authorized by a resolution of the governing body of the Fifth Ward Gravity Drainage District No. 1
Local Organization

adopted at a meeting held on ______________________

Secretary, Local Organization

Post Office Box 108
Estherwood, Louisiana 70534
Address Zip Code

Date 4/11/75

Appropriate and careful consideration has been given to the environmental impact statement prepared for this project and to the environmental aspects thereof.

Soil Conservation Service
United States Department of Agriculture

Approved by:

State Conservationist

APR 24 1975
Date

WATERSHED WORK PLAN

BAYOU PLAQUEMINE BRULE WATERSHED

Acadia and St. Landry Parishes, Louisiana

March 1975

SUMMARY OF PLAN

The watershed contains 234,400 acres (366 square miles) in southwestern Louisiana. The Sponsors are the Acadia Parish and the St. Landry Parish Police Juries, the Acadia and the St. Landry Soil and Water Conservation Districts, and 11 drainage districts. Technical assistance was furnished by the Soil Conservation Service and Forest Service of the U.S. Department of Agriculture, the Fish and Wildlife Service of the U.S. Department of the Interior, and the Wild Life and Fisheries Commission and the Department of Public Works of the State of Louisiana.

The major problems considered in this plan are flooding and poor drainage. They occur, in varying degrees, on the 111,600 acres shown as benefited areas on the Project Map (Figure 8). They cause excessive damages and crop production costs, restricted crop yield and quality, inconveniences, and health problems. Increased drainage and flood protection, which would allow the land to produce near its full potential, can be furnished only by comprehensive channel work.

Analyses of the merits of various levels of agricultural protection were conducted. A 3-year level of flood protection and drainage was chosen after economic, environmental, and social effects had been carefully analyzed. Although damages from a 3-year storm will be minimal with project conditions, some out-of-bank flow will still occur in benefited areas. The duration of flooding will not be long enough to seriously impair agricultural production. Average annual damages in agricultural areas will be reduced about 71 percent.

Urban areas in Church Point and Crowley have occasional significant damages from flooding. The damages in Church Point are caused by headwater flooding from Bayou Plaquemein Brule. The damages in Crowley are caused principally by headwater flooding from tributaries of Bayou Plaquemine Brule.

SUMMARY

Flood damages in Church Point will be minimized by enlarging approximately 3 miles of Bayou Plaquemine Brule. This work was determined to be the only economically feasible solution to the flooding problem.

No feasible solution to the flooding problem in Crowley was found to be within the scope of Public Law 566. The costs of structural measures that would significantly reduce damages would greatly exceed benefits.

The Sponsor selected 396 miles of channels to be investigated. Approximately 394 miles (99.5 percent) are classified as manmade or previously modified channels, and 2 miles (0.5 percent) are unmodified, well-defined natural channels. Approximately 229 miles will require work: 26 miles will require clearing, and 203 miles will require excavation. The 229 miles includes 218 miles (95 percent) with ephemeral flow, 5 miles (2 percent) with intermittent flow, and 6 miles (3 percent) with ponded water. No channels with perennial flow will be worked.

Channel work and appurtenant structures will cause approximately 840 additional acres of land to be committed to rights-of-way. Approximately 77 additional acres will be in channels, 447 additional acres will be in berms, and 316 additional acres will be in spoil. About 90 acres of forest land will be cleared. Spoil in forest land will be planted with seedlings of hardwood species that are valuable to wildlife. Rights-of-way disturbances will cause decreases in most forest wildlife species and increases in most open land wildlife species.

Damages to fish and wildlife habitat will be offset, in part, by installation of seven structures for water control (weirs). They will create approximately 12 miles (33 acres) of permanent water which will provide habitat for fish and wildlife. These structures will reduce sediment in downstream channels, reduce growth of vegetation in upstream channels, and provide limited amounts of irrigation storage. Structures for water control (pipe drops) and grade stabilization structures (drop inlets) will be installed as channel appurtenances.

Approximately 2,900 persons in farm households will benefit from increased income generated by the project. The other 40,500 watershed residents, as well as residents of the surrounding area, will benefit from increased economic activity generated by project works and direct benefits.

The work plan proposes an installation period of 6 years for structural measures and 10 years for land treatment measures. The total installation cost is estimated to be $8,406,800, of which Public

Law 566 funds will bear $3,492,880 (about 42 percent) and $4,913,920 (about 58 percent) will be borne by other funds.

Landowners and operators cooperating with the Acadia and the St. Landry Soil and Water Conservation Districts will install land treatment measures that reduce floodwater and sediment damages and improve drainage conditions. The effectiveness of these measures is dependent, to a large extent, on the installation of project channels. The cost of land treatment measures is estimated to be $3,349,300. Of this total, Public Law 566 funds will provide $238,100 and other funds will provide $3,111,200. Landowners and operators, with aid from Federal and State programs, will bear the cost of applying land treatment measures. The estimated cost of structural measures is $5,057,500, of which Public Law 566 funds will bear $3,254,780 and other funds will bear $1,802,720.

Average annual benefits are estimated to be $2,060,800, including $213,500 of annual secondary benefits. The estimated average annual cost, which is the sum of amortized installation costs and operation and maintenance costs, is $391,200. The benefit-cost ratio is 5.3 to 1.

Landowners and operators will maintain land treatment measures on their farms. The Sponsors will operate and maintain structural measures. Estimated annual operation and maintenance cost of structural measures based on current prices is $87,000.

The Louisiana Department of Public Works has agreed to share in the local cost of installing the structural measures contingent on the appropriation of funds for this purpose by the Louisiana Legislature. The Sponsors recognize additional funds may be needed to finance project installation and will be responsible for obtaining additional financing as necessary.

WATERSHED RESOURCES - ENVIRONMENTAL SETTING[1]

Physical Data

The Bayou Plaquemine Brule Watershed contains 234,400 acres in southwestern Louisiana. Approximately 200,000 acres are in Acadia Parish and 34,400 acres are in southwestern St. Landry Parish. The boundary is the natural divide surrounding the drainage area of Bayou Plaquemine Brule.

Five cities, towns, and villages are situated wholly or partially within the watershed. Crowley, the parish seat of Acadia Parish, has a population of 17,200; Church Point has a population of 3,900; Estherwood has a population of 700. Approximately 90 percent of Rayne, which has a population of 9,500, is in the watershed. Less than 5 percent of Opelousas, which has a population of 20,000 and is the parish seat of St. Landry Parish, is in the watershed.

Other important cities are within easy access of the area. Baton Rouge, the State capitol, is 70 miles east; Lafayette, an important petroleum center, is 15 miles southeast; Lake Charles, an important industrial and shipping center, is 35 miles west.

Federal Highways 90, 190, and I-10, traversing the watershed, provide easy access to the east and west. Several State highways and parish roads provide access between points inside the watershed and to points outside the watershed, especially to the north and south.

The southwestern half of the watershed is in the Gulf Coast Prairie Land Resources Area; the other half is in the Southern Mississippi Valley Silty Upland Land Resource Area.[2] The Prairie formation of the Pleistocene Series is the basic formation underlying the watershed.[3] A thin mantle of loess overlies the Prairie formation in the Southern Mississippi Valley Silty Upland section.

1/ All information and data, except as otherwise noted by reference to source, were collected or compiled during watershed planning investigations by the Soil Conservation Service and Forest Service, U.S. Department of Agriculture.

2/ U.S. Department of Agriculture, Land Resource Regions and Major Land Resource Areas of the United States, Handbook No. 296 (Washington: U.S. Government Printing Office, 1965), pp. 59 and 69.

3/ Rufus J. LeBlanc, Geologic Map of Louisiana, a map complied from several sources of data, Baton Rouge, Louisiana, 1948.

The watershed is in the Mermentau River Basin of the Lower Mississippi Region.[4/] It is typical of the prairie section of southwest Louisiana. Flooding and drainage problems are similar to those of almost all flatland areas. However, the proportional area of open land that has headwater flooding is smaller than is typical in alluvial valleys. The surface is slightly undulating and the major streams have depressed forested flood plains which are adequate outlets for agricultural drainage.

Approximately 124,400 acres of agricultural land have crops damaged by flooding and poor drainage, which are the result of inadequate channel capacities of some of the tributaries of Bayou Plaquemine Brule. Road and bridge damages occur on inadequate channels. Church Point and Crowley have occasional flood damages in urban areas.

As a basis for conservation planning, the soils are grouped in accordance with the soil capability classification system.[5/] These groupings are based on the limitation of the soil, damage risk, and response of crops to treatment. In the capability system, all soils are grouped at three levels--the capability class, the subclass, and the unit.

Capability Classes, the broadest group, are designated by Roman numerals I through VIII. In Class I are soils that have few limitations, the widest range of use, and the least risk of damage when they are used. The soils in the other classes have progressively greater natural limitations. In Class VIII are soils and landforms so rough, so shallow, or otherwise so limited that they do not produce worthwhile yields of crops, forage, or wood products. Classes I, II, and III are suitable for cropland, Class IV is marginal, and Classes V-VIII are unsuited for cropland.

Capability subclasses are soil groups within one class; they are designated by adding a small letter, "e" or "w" to the class numeral. The letter "e" shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; "w" shows that water in or on the soil interferes with plant growth or cultivation.

4/ U.S. Department of Agriculture, Soil Conservation Service, Atlas of River Basins of the United States, (2nd Edition; Washington: U.S. Government Printing Office, 1970), Map No. 14.

5/ A. A. Klingbeil and P. H. Montgomery, "Land Capability Classification," U.S. Department of Agriculture, Soil Conservation Service, Agriculture Handbook No. 210 (1961), p. 21.

SETTING

The general soil map of the watershed, page 7, shows the location of soil associations. The associations are Crowley-Midland, Patoutville-Jeanerette, Olivier-Loring, Acadia-Wrightsville, Wet Alluvial Land, and Memphis-Loring.

The Crowley-Midland association comprises 45 percent of the watershed. Crowley soils are somewhat poorly drained, have loamy surface layers and clayey subsoils, and occur on nearly level, low ridges. Midland soils are poorly drained and have loamy surface layers and clayey subsoils. They occur in depressions in flat areas. The Midland soils and most Crowley soils are in Capability Class IIIw. The native vegetation on these soils was tall prairie grasses, but now they are used to grow rice and soybeans.

The Patoutville-Jeanerette association comprises 44 percent of the watershed. These are somewhat poorly-drained soils that are loamy throughout. They occur on the nearly level, low ridges and narrow depressions and are in Capability Class IIw. The native vegetation was tall prairie grasses and scattered clumps of hardwood trees (savannas); they are used now to grow rice, soybeans, cotton, and sweet potatoes.

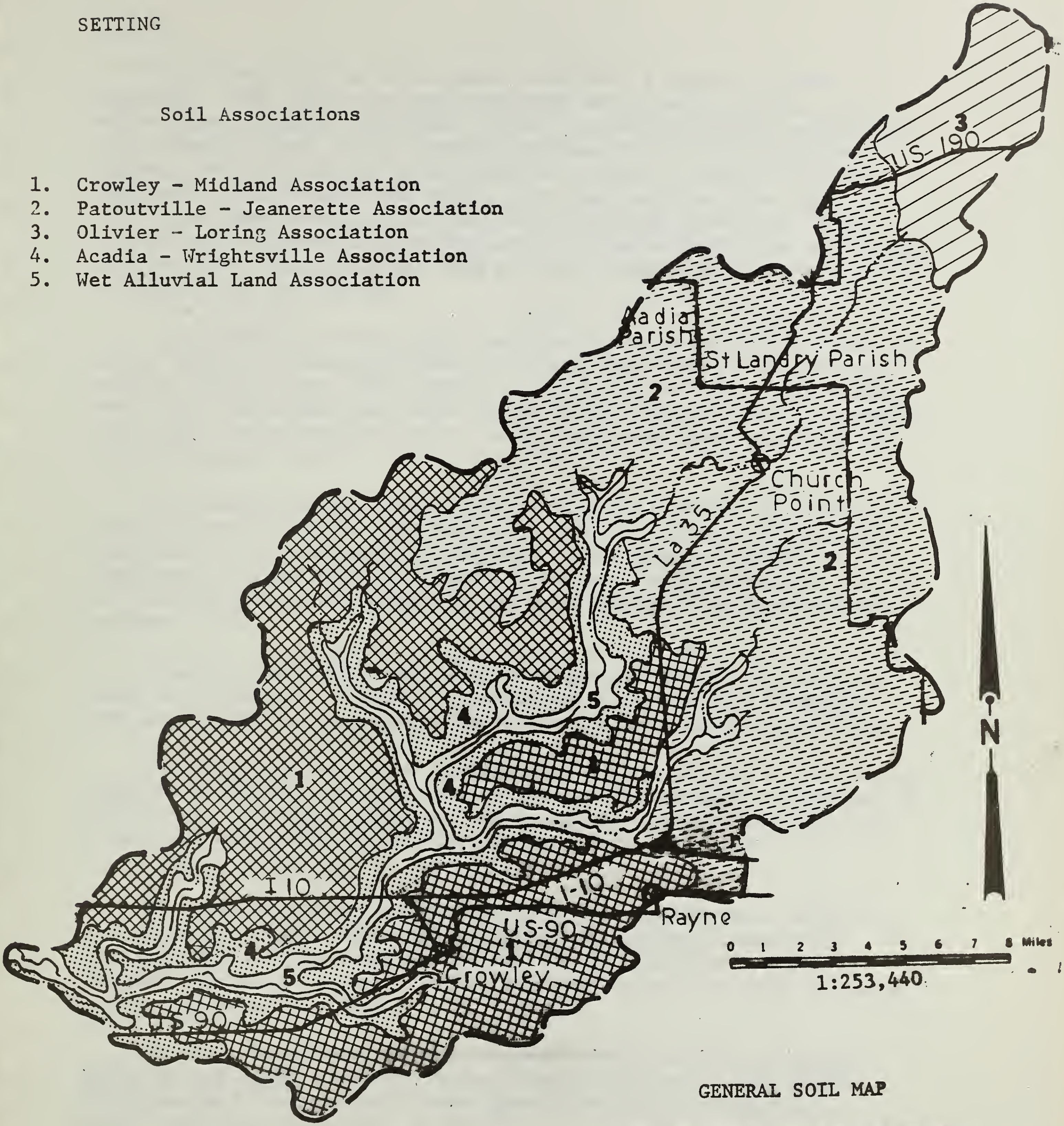
The Olivier-Loring association comprises 4 percent of the watershed. Soils are nearly level to gently sloping and are loamy throughout. Olivier soils are somewhat poorly drained and are in Capability Class IIw. Loring soils are moderately well drained and are in Capability Class IIe. The native vegetation was bluestem grasses with scattered pines and clumps of hardwoods. The soils are now being used for row crops pasture, and forest.

The Acadia-Wrightsville association comprises 3 percent of the watershed. The soils occur along the narrow, wooded valleys of Bayou Plaquemine Brule and its larger tributaries. Acadia soils are somewhat poorly drained and have loamy surface layers and clayey subsoils. They are on both the level and gently sloping areas. They are in Capability Class IIIw on the level areas and Capability Class IIIe on the gently sloping areas. Wrightsville soils are level or depressed, poorly drained, and in Capability Class IIIw. They have loamy surface layers and clayey subsoils. The native vegetation was pine and hardwood trees; but much of the level and gently sloping land has been cleared and is now in rice, soybeans, and pasture. The steeper slopes are generally forested.

The Wet Alluvial Land association comprises 3 percent of the watershed. The soils of this association occur in the narrow flood plains of local streams at low elevations. Soil texture ranges from silt to clay. Frequent flooding and poor drainage are the main limitations. The soils are in Capability Class Vw. The native vegetation was hardwoods, which are used now for timber production, hunting, and grazing. A small amount of the forest has been cleared for pasture and soybeans.

Soil Associations

1. Crowley - Midland Association
2. Patoutville - Jeanerette Association
3. Olivier - Loring Association
4. Acadia - Wrightsville Association
5. Wet Alluvial Land Association



GENERAL SOIL MAP

BAYOU PLAQUEMINE BRULE WATERSHED

Acadia and St. Landry Parishes
Louisiana

U. S. Department of Agriculture
Soil Conservation Service
Alexandria, Louisiana

September 1974

Compiled from SCS General Soil Maps of
Acadia and St. Landry Parishes

SETTING

The Memphis-Loring association comprises 1 percent of the watershed. The soils are gently sloping to strongly sloping. The well-drained Memphis soils have a silt loam surface with a silty clay loam subsoil. They are in Capability Class I on 0- to 1-percent slopes, and Class IIe on 1- to 3-percent slopes. Loring soils are moderately well drained and have a silt loam surface layer and silty clay loam subsoil. They are in Capability Class IIe. The native vegetation was bluestem grasses with scattered pines and clumps of hardwoods. The soils are used now for cotton, small grains, soybeans, hay, and forest.

The topography of the major portion of the watershed is level to gently sloping. Steeper slopes occur in transitions from the terrace surface to the lower flood plains of the larger streams. Elevations range from about mean sea level in the flood plain of Bayou Plaquemine Brule near the watershed outlet, to 70 feet above mean sea level in the northernmost part.

The average annual rainfall of 58 inches is evenly distributed by seasons except that the fall has only about 12 inches. The average temperature is 68 degrees Fahrenheit.[6/] The average monthly temperature ranges from 52 degrees in January to 82 degrees in July.[7/] The average frost-free period of 265 days extends from February 28 to November 20.[8/]

Mineral resources of the watershed are limited to oil and gas, which are abundant. Almost all production is influenced by faults and anticlines. A deep-seated salt dome probably exists at Crowley.

The Chicot Ground Water Aquifer, one of the largest in the State, supplies municipal and agricultural water. The aquifer is composed of Pleistocene sands and gravels. The Evangeline Aquifer is below the Chicot and has salty water under almost all the watershed.

6/ U.S. Department of Agriculture, Soil Conservation Service, Letter to the States about ENG-Hydrology-Directives, Chapter 21, National Engineering Handbook-Section 4 - Hydrology-Part 1 (South Regional Technical Service Center, Engineering and Watershed Planning Unit), September 16, 1965.

7/ U.S. Department of Agriculture, Forest Service, A Forest Atlas of the South (Southern Forest Experiment Section-New Orleans, Louisiana and Southeastern Forest Experiment Station-Asheville, North Carolina, 1969), pp. 22 and 23.

8/ U.S. Department of Agriculture, Climate and Man - 1941 Yearbook of Agriculture (Washington: U.S. Government Printing Office, 1941), pp. 900-901.

SETTING

Tabulations on pages 9 and 10 show a driller's log and chemical analysis of water from wells at Crowley.[9] Both wells draw from the Chicot Aquifer.

The watershed contains large acreages of cropland with smaller amounts of pastureland and forest land. The following tabulation shows present acreages and percentages of land use by major categories:

Land Use	Acres	Percent
Cropland	176,000	75
Pastureland	11,100	5
Forest Land[a]	25,100	11
Other[b]	22,200	9
Total	234,400	100

a/ Includes 12,130 acres of Type 1 wetlands.
b/ Includes roads, stream channels, lakes, communities, farmsteads, and Type 5 wetlands.

Driller's Log of Well Ac-169

Material	Thickness (feet)	Depth (feet)
Clay	19	19
Sand, fine	19	38
Clay	22	60
Gumbo (Saturated clay)	37	97
Sand, fine	22	119
Sand	19	138
Sand, coarse	37	175
Sand and gravel	19	194
Gravel	86	280

9/ Louisiana Department of Public Works; J. L. Snider, M. D. Winner, Jr., I. B. Epstein, Ground Water for Louisiana's Public Supplies (Baton Rouge: Louisiana Department of Public Works, 1962), p. 12.

Chemical Analysis of Water from Well Ac-170
(Results in parts per million except as indicated)
Date of Collection: October 14, 1959

Silica (SiO_2)	31	Dissolved solids:	
Iron (Fe)[a/]	.11	Calculated (Sum)	400
Iron (Fe)[b/]	1.7	Residue on evaporation at 180°C	424
Manganese (Mn)	.01	Hardness as $CaCO_3$	219
Calcium (Ca)	53	Noncarbonate hardness	-
Magnesium (Mg)	21	Percent sodium	39
Sodium (Na)	66	Specific conductance	
Potassium (K)	2.2	(micromhos at 25°C)	669
Bicarbonate (HCO_3)	403	Color[c/] (cobalt units)	30
Carbonate (CO_3)	-	Carbon dioxide (CO_2), calc.	-
Sulfate (SO_4)	1.8	pH (Lab.)[c/]	7.3
Chloride (Cl)	25	Temperature (°F)	72
Fluoride (F)	.2		
Nitrate (NO_3)	.1		
Phosphate (PO_4)	.3		
Boron (B)	.04		

a/ In solution at time of analysis.
b/ Total amount of iron in sample; presumably in solution when collected.
c/ Not in parts per million.

Crop and pasture plants have replaced the original prairie and savanna vegetation. Climax vegetation of the prairie includes Indiangrass, big bluestem, pinehill bluestem, Eastern gamagrass, switchgrass, paille fine, fall panicum, giant cutgrass, and sedges. Climax vegetation of the savannas includes bluestem grasses, pines, and hardwoods. Pastures contain carpetgrass, vaseygrass, bermudagrass, dallisgrass, ryegrass, goat weed, wild millet, sedges, lespedezas, and clovers.

The overstory in the forests adjacent to the flood plains is mixed pines and hardwoods. Predominant species are loblolly pine, water oak, blackgum, sweetgum, green ash, and hickories. The overstory on the flood plains contains water oak, overcup oak, American elm, sweetgum, black willow, bald cypress, water tupelo, hackberry, and bitter pecan. Understory plants include reproduction from the overstory with honeysuckle, hawthorn, greenbrier, swamp privet, blackberry, rattan, palmetto, switchcane, grasses, ferns, and forbs. Transitional vegetation occurs between forest land and open land and consists mainly of a mixture of understory, reproduction of overstory, and open land plants.

Bayou Plaquemine Brule at Louisiana Highway 13 (Perennial flow)

Bayou Plaquemine Brule at Quebodaux Ferry near outlet

The quality, vigor, and beauty of hardwoods and cypress have deteriorated because the trees of greater commercial value have been harvested and those of lesser value have been left to grow. Private landowners, in some cases, have worked to improve their forest management practices to alleviate the deterioration of the forest resource. The multiple ownership and lack of interest appears to preclude any accelerated management. The present uses of the forest land are outdoor recreational activities and limited timber production. Maintaining the existing forest land for these uses is important to the local people in preserving the quality and quantity of many forms of outdoor recreation.

Bayou Plaquemine Brule, which drains the entire watershed, flows southwesterly from its headwaters near Opelousas to Bayou des Cannes west of Crowley. Flow characteristics in Bayou Plaquemine Brule change progressively in a downstream direction from ephemeral to intermittent to perennial. Other channels have ephemeral or intermittent flow. Water drained from ricefields during the growing season sometimes adds to the flow. The average annual runoff is approximately 22 inches.

Before farming became prominent in the watershed area, the ground cover was dense grass, scattered brush, and trees. The natural drainage system consisted of a pattern of bayous and wide, shallow natural depressions. As the demand for food and fiber generated more interest in farming, a drainage improvement program was initiated which included enlarging and clearing out these natural depressions. Most of the channels that comprise the present drainage system have previously been dug, and in many cases, more than once. The geometric configuration and alignment of the water courses have been altered. Cleaning of these channels for the past 50 years has resulted in the present outlet system of manmade "drainage ditches." The photographs on page 13 show typical drainage ditches.

An inventory of the existing drainage system was made to determine the type of channels and flow characteristics. The inventory showed that 99 percent by length, are manmade or previously modified and 1 percent are in a natural, unmodified condition; 74 percent have ephemeral flow characteristics, 16 percent have intermittent flow, 6 percent have perennial flow, and 4 percent have ponded water. The lower 24 miles of Bayou Plaquemine Brule has perennial flow. Base

A typical drainage ditch in open land

An intermittent channel in forest land

flow in the perennial reach is indicated in the following tabulation of approximate minimum flow probabilities at Louisiana Highway 13:[10/]

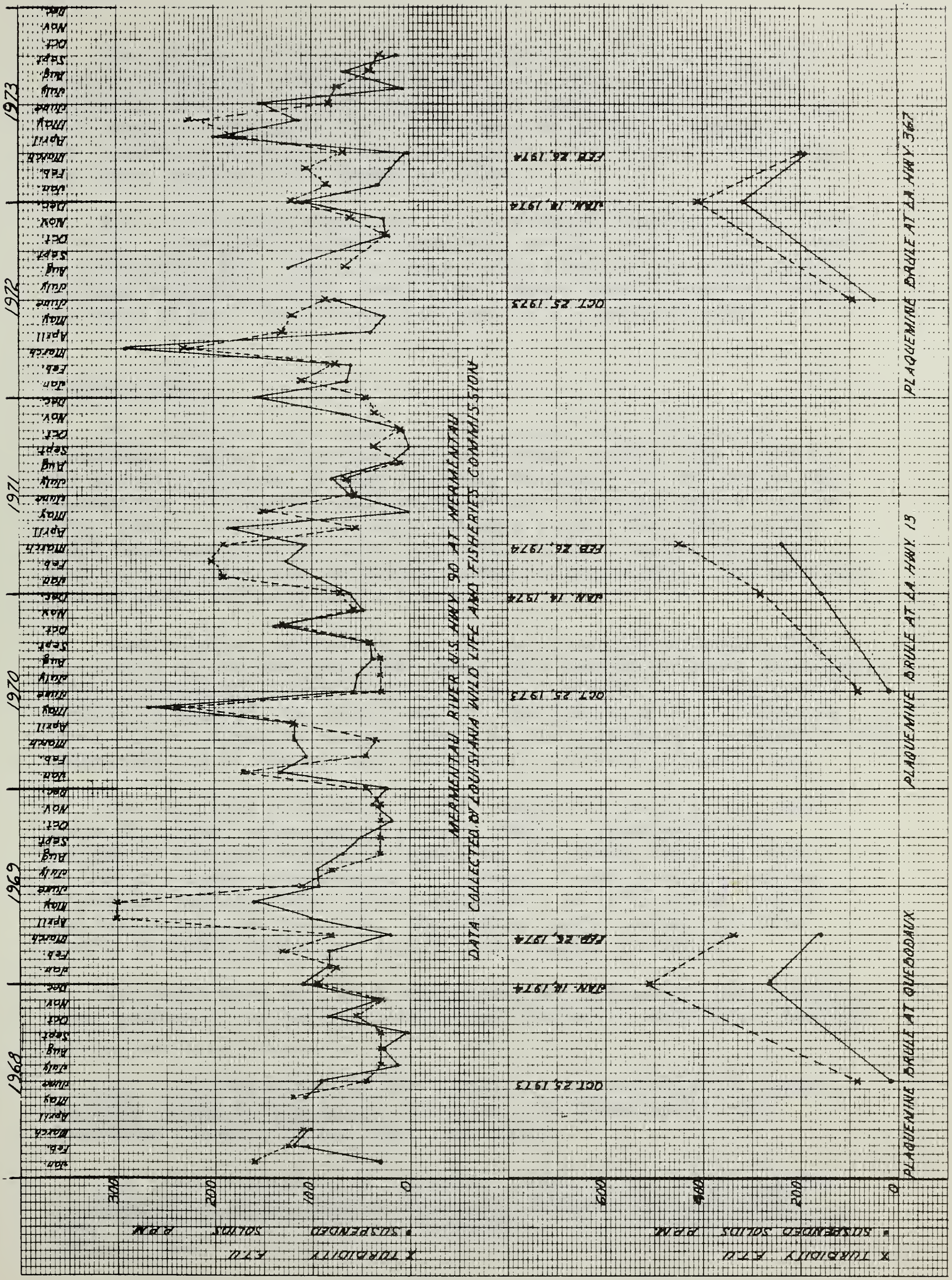
Average Recurrence Interval Years	Lowest average flow in cfs. for the indicated number of consecutive days					
	7	15	30	60	120	183
2	2.3	7.6	28.0	71	149	237
5	.5	1.8	13.0	33	93	151
10	0	.5	7.6	20	78	129

There are 185 ponds and lakes in the watershed. Eighteen of these ponds and lakes are 5 acres or larger and the remaining 167 are small farm ponds averaging less than an acre in size. The total surface area of these smaller farm ponds is about 45 acres and they are used mostly for watering livestock and limited fishing. Eleven of the larger ponds and lakes, comprising a total surface area of 120 acres, also provide water for livestock and fishing; seven are commercial catfish ponds on 22 acres. Also, there are 19 crawfish ponds with a total of 550 acres. Crawfish pond acreages were not included in the regular pond category since these areas normally would not have permanent water, and crawfish are considered an agricultural crop.

A graph on the following page shows concentrations of suspended solids and turbidity of water in the Mermentau River during the period January 1968 to September 1973. Other graphs on this page show the results of samples taken at three points in Bayou Plaquemine Brule in 1973 and 1974.

All soils described on previous pages are subject to aqueous suspension. Portions of all soils are subject to being suspended in a colloidial form. Materials in a colloidial suspension are subject to flocculation and deposition caused by amounts of colloidial matter present, changes in temperature, and changes in the chemical regime of the carrying agent. Land treatment measures that increase soil cover and thereby reduce the amount of erosion are the most effective methods of reducing suspended or colloidial sediment.

10/ U.S. Department of the Interior, Geological Survey, and Louisiana Department of Public Works, Water Supply Characteristics of Louisiana Streams, Technical Report No. 1 (Baton Rouge: Louisiana Department of Public Works, April 1963), pp. 104, 106.


MERMENTAU RIVER U.S. HWY 90 AT MERMENTAU
DATA COLLECTED BY LOUISIANA WILD LIFE AND FISHERIES COMMISSION
PLAQUEMINE BRULE AT LA. HWY 367
PLAQUEMINE BRULE AT LA. HWY 13
x TURBIDITY F.T.U.
• SUSPENDED SOLIDS P.P.M.
1968
1969
1970
1971
1972
1973
OCT. 25, 1973
JAN. 18, 1974
FEB. 26, 1974

The Division of Water Pollution Control of the Louisiana Wild Life and Fisheries Commission has monitored water quality of the Mermentau River for several years. Water samples used in their tests were obtained monthly at the U.S. Highway 90 bridge at Mermentau. The tabulation on page 17 shows the results of 6 years of monitoring the water quality in the Mermentau River.

The 12,272 acres of wetland in the watershed include 12,130 acres of Type 1 (seasonally flooded hardwoods) and 142 acres of Type 5 (ponds or reservoirs).[11/] Type 1 wetlands occupy parts of the flood plains of Bayou Plaquemine Brule, Bayou Blanc, Bayou Jonas, Long Point Gully, and Bayou Wikoff. Type 5 wetlands consist of scattered ponds.

Economic Data

The industries of a region can be grouped into three broad categories. Basic industries such as farming, mining, and forestry use natural resources to make materials available for processing and consumption. Processing and manufacturing industries such as cotton gins, grain elevators, petroleum refining plants, and lumber mills alter materials from the basic industries to make useful products. Service industries such as merchandising, transportation, and medicine provide goods and services to consumers.

Acadia Parish census data for 1970 were used to determine that 21 percent of the employed labor force were engaged in basic industries, which includes 10 percent in agriculture, 9 percent in mining, and 2 percent in forestry and fisheries. Of the remainder of the employed labor force, 18 percent were employed in the processing and manufacturing industries and 61 percent were employed in the service industries.

The watershed population in 1970, estimated to be 43,400, was about 66 percent urban and 34 percent rural. Approximately 33 percent of the populations of Acadia and St. Landry Parishes live in the watershed; approximately 14 percent of the rural populations of the two parishes live in the watershed. In 1970, Acadia Parish had 6.8 percent unemployment. The median family income was about $5,550 in Acadia Parish and $4,920 in St. Landry Parish.[12/]

The major farm and ranch enterprises are soybeans, rice, cotton, sweet potatoes, and cattle. Industries related to agriculture include

---

11/ U.S. Department of the Interior, Fish and Wildlife Service, Wetlands of the United States, Circular C-39 (Washington: U.S. Government Printing Office, 1956, pp. 20-22.

12/ U.S. Department of Commerce, Bureau of the Census, Census of Population: 1970, General Social and Economic Characteristics, Final Report PC (1) - C20, La. (Washington: U.S. Government Printing Office, 1972).

Water Quality Data - Mementau River, U.S. Highway 90 Bridge, Mermentau[a/]
Bayou Plaquemine Brule Watershed, Louisiana

Year		pH (UNITS)	Diss. Oxygen (PPM)	Oxygen Saturation (PERCENT)	Temp (°C)	Turbid-ity (UNITS)	True Color (UNITS)	Susp. Solids (PPM)	Diss. Solids (PPM)	Total Solids (PPM)	Specific Conductance (UMHOS/CM^2)	Total Hardness (PPM)	Total Alkal. (PPM)	Sul-fates (PPM)	Chlorides (PPM)	Sodiu (PPM
1973	Mean	6.6	5.7	63	20	98	76	67	175	242	138	50	48	11	30	13
	Maximum	7.2 S[b/]	7.2 SP	77 S	29 S	225 SP	160 S	200 SP	406 SP	518 SP	285 F	117 SP	115 F	52 W	77 S	41 F
	Minimum	6.1 W	4.0 S	43 SP	10 W	25 F	30 F	2 SP	74 SP	104 W	40 W	24 W	12 W	0 S	9 W	2 W
1972	Mean	6.9	5.9	-	-	101	60	85	158	242	107	32	30	5	23	16
	Maximum	7.9 W	9.5 W	-	-	230 SP	80 SP	292 SP	312 S	584 SP	180 F	60 F	60 F	23 S	43 S	31 SP
	Minimum	6.3 S	3.6 F	-	-	20 W	20 W	24 F	40 F	66 W	48 W	11 W	14 SP	0 W	6 SP	1 W
1971	Mean	6.7	5.3	60	21	87	58	76	182	257	189	49	33	18	24	19
	Maximum	7.8 F	7.4 W	79 S	30 S	203 S	100 F	186 SP	476 SP	554 SP	455 S	196 S	70 S	50 SP	58 W	78 F
	Minimum	6.2 SP	3.2 F	37 F	10 W	10 W	30 S	0 F	40 F	82 F	85 SP	28 F	12 W	2 S	10 F	5 F
1970	Mean	6.5	6.0	66	20	83	50	98	170	268	222	44	45	15	29	25
	Maximum	7.2 S	8.0 F	89 S	32 S	240 SP	80 SP	268 SP	298 SP	430 W	420 S	102 S	120 S	36 F	53 SP	38 S
	Minimum	5.8 SP	3.8 F	46 F	7 W	30 F	20 F	36 S	78 SP	148 F	98 F	16 F	16 F	0 SP	8 F	8 F
1969	Mean	6.6	5.4	57	19	103	42	70	194	264	260	53	43	10	34	25
	Maximum	8.0 S	9.0 SP	96 S	29 S	300 SP	60 SP	160 SP	250 SP	364 SP	424 W	87 S	97 F	47 W	72 F	43 F
	Minimum	5.5 F	2.0 F	20 W	8 W	30 F	20 F	18 F	156 F	174 F	74 SP	19 SP	11 SP	0 SP	10 SP	8 SP
1968	Mean	6.8	7.5	80	19	75	37	65	197	262	288	46	45	15	34	29
	Maximum	7.9 S	10.6 S	122 S	30 S	160 S	55 S	118 W	284 S	376	549 S	82 S	98 S	42 W	49 F	48 S
	Minimum	6.3 SP	4.8 F	51 S	7 W	30 W	20 W	2 W	62 W	172	156 W	24 W	14 W	1 W	14 W	12 W
1968-73	Average															
	Mean	6.7	6.0	65	20	91	54	77	179	256	201	46	41	12	29	21
	Maximum	7.7	8.6	93	30	226	89	204	338	452	386	107	93	42	59	47
	Minimum	6.0	3.6	39	8	24	23	14	75	124	84	20	13	13	10	5

a/ Unpublished Data. Louisiana Wild Life and Fisheries Commission. Division of Water Pollution Control.

b/ Sp = March, April, May
S = June, July, May
F = September, October, November
W = December, January, February

cotton gins, grain elevators, flying services, rice mills, rice dryers, feed mills, and retailing of supplies and equipment.

Crop acreages in the problem areas include approximately 46,700 acres of soybeans, 34,100 acres of rice, 5,900 acres of sweet potatoes, 4,800 acres of cotton, and 4,300 acres of corn. Land used for beef production consists of 6,000 acres of permanent pasture and 10,600 acres of rice-rotational pasture.

The estimated 25,100 acres of forest land is in small, privately-owned tracts. Wetness or frequent flooding have prevented development of the forest land for cropland or pastureland.

Data from the 1969 Census of Agriculture were used in estimating that the watershed contains 800 farms averaging 234 acres. Approximately 90 percent, or 720, are owned and operated by families living on the farms.

Agricultural land values in the watershed range between $400 and $800 per acre. The values depend on location and soil capability.

The only public lands in the watershed are 984 acres owned by the Louisiana State University Rice Experiment Station and 546 acres owned by the St. Landry Parish Police Jury.

The watershed is in the Lower Mississippi Region Comprehensive Study area and the Southwest Louisiana River Basin Study area. Data used in this work plan were coordinated with data used in the study reports.

Approximately 580 miles of Federal, State, and parish roads provide good access to markets under normal conditions. Parts of some roads are flooded after heavy rains. The three railroad companies providing service have loading facilities at several points.

Fish Resources

Fisheries of the watershed produce moderate amounts of commercial species and small amounts of game species. Bayou Plaquemine Brule and some of its tributaries such as Bayou Jonas, Bayou Wikoff, Bayou Blanc, and Long Point Gully are the major channel fisheries. These channels provide approximately 97 miles and 630 acres of fish habitat. Flow velocities in these channels are generally slow except during heavy runoff when they may be 2 to 4 feet per second.

Farm ponds, borrow pits, and one small lake are the important pond fisheries. These ponds have 142 acres total surface area and an estimated standing crop of 150 pounds of fish per acre. They contain largemouth bass, bluegill, channel catfish, and yellow bullhead.

SETTING

The channel fisheries were evaluated by stream reaches. Bayou Plaquemine Brule is a perennial stream containing 230 acres of water in the 24-mile reach downstream from Louisiana Highway 98. The channel has been previously modified, but the banks support vegetation in the manner of natural channels of the locality. The channel is 80 to 150 feet wide and 8 to 20 feet deep. Poor water quality as a result of high values for turbidity, suspended solids, color, and to a lesser extent phosphate, nitrogen, and sulfide in this reach is reflected in the water quality data presented on the following page. Pesticide residues found in fish tissues range from the following: Benzene Hexachloride (white crappie - .01 ppm, bluegill - .02 ppm, gar - .02 ppm); DDT (white crappie - .13 - .50 ppm, gar - 2.69 ppm); Toxaphene (bluegill - .38 ppm, gar - 4.20 ppm). For additional data refer to the tabulation on Pesticide Residue Concentrations (page 21). The reach has a standing crop of 130 pounds of fish per acre. This amount is the average weight of two 1-acre rotenone samples taken 1.5 miles downstream from Quebodaux Ferry in June 1973 by Louisiana Wild Life and Fisheries Commission personnel and Soil Conservation Service personnel. Existing species include yellow bullhead, channel catfish, blue catfish, smallmouth buffalo, carp, drum, shortnose gar, gizzard shad, bowfin, crappies, and bluegill. Commercial species are dominant. Minor tributaries have ephemeral flow. Ephemeral channels in the watershed do not produce significant amounts of fish, but they produce some important fish food organisms.

Bayou Blanc contains 40 acres of poor quality, ponded water in its lower 7 miles. The ponded water has an estimated 70 pounds of fish per acre. The remainder of Bayou Blanc and its tributaries have ephemeral flow.

Bayou Jonas has 38 acres of ponded water in its lower 9 miles. The channel is 30 to 40 feet wide and 4 to 8 feet deep. The water, which has high concentrations of suspended solids, high color units, and high turbidity, contains an estimated 65 pounds of fish per acre. The remainder of Bayou Jonas and its tributaries have ephemeral flow.

Bayou Wikoff has intermittent flow in the lower 22 miles with an estimated 20 pounds of fish per acre. The channel, which has been previously modified, is 10 to 60 feet wide and 2 to 8 feet deep. The remainder of Bayou Wikoff and its tributaries have ephemeral flow.

The lower reaches of Long Point Gully and Gumpoint Gully have similar fisheries. Long Point Gully has 7 miles of intermittent channels and Gumpoint Gully has 1 mile of intermittent channel. The channels, which have been previously modified, are 20 to 70 feet wide and 3 to 6 feet deep.

The intermittent channels have an estimated 15 pounds of fish per acre. The remainder of these two drainageways along with Prather Gully, Cole Gully, Blaise Lejeune Gully, and their tributaries have ephemeral flow.

WATER QUALITY DATA FOR PLAQUEMINE BRULE WATERSHED
(1973-1974)

PARAMETERS	SAMPLE DATE	STATION NO. 1[a]	STATION NO. 2[b]	STATION NO. 3[c]	STATION NO. 4[d]	STATION NO. 5[e]	STATIONS 1-5 AVERAGE
COLOR	10/25/73	200	220	255	g/	g/	225
(apparent)	1/14/74	1250	720	1165	1225	g/	1090
Units	2/26/74	1070	1320	560	810	640	850
Average[f]		840	753	660	1018	640	732
HARDNESS	10/25/73				g/		
mg/l as $CaCO_3$	1/14/74	46	38	40	48	g/	43
	2/26/74	40	50	130	148	92	93
Average[f]		43	44	85	98	92	68
NITROGEN, AMMONIA	10/25/73	0.37	0.05	0.0	g/	g/	0.14
mg/l N	1/14/74	2.7	1.25	2.22	2.8	g/	2.24
	2/26/74	2.5	2.8	2.2	1.7	1.8	2.2
Average[f]		1.85	1.36	1.47	2.25	1.8	1.52
NITROGEN, NITRATE	10/25/73	0.08	0.24	0.9	g/	g/	0.2
mg/l N	1/14/74	.23	.21	0.23	0.22	g/	.22
	2/26/74	.35	.27	1.4	.53	0.43	.59
Average[f]		.22	.24	0.84	.37	.43	.33
OXYGEN	10/25/73	3.0	12.0	4	g/	g/	6.3
mg/l O_2	1/14/74	7.0	8.0	9	8	g/	8.0
	2/26/74	7.0	6.0	8	8	10	7.8
Average[f]		5.7	8.7	7	8	10	7.4
pH	10/25/73	6.5	8.5	7.5	g/	g/	7.5
Units	1/14/74	7.0	7.0	7.0	7.0	g/	7.0
	2/26/74	7.0	7.0	7.5	7.5	7.5	7.3
Average[f]		6.8	7.5	7.3	7.2	7.5	7.3
PHOSPHATE, ORTHO	10/25/73	1.2	0.9	0.88	g/	g/	0.99
mg/l PO_4	1/14/74	1.61	1.21	1.55	1.6	g/	1.49
	2/26/74	1.5	1.5	1.33	1.1	0.9	1.26
Average[f].		1.43	1.2	1.24	1.35	.9	1.24
SULFATE	10/25/73	5.0	0	85	g/	g/	30
mg/l SO_4	1/14/74	0.0	3	0	0	g/	.75
	2/26/74	0.0	0	33	0	0	6.6
Average[f]		1.6	1	39	0	0	12.5
SULFIDE	10/25/73	0.08	0.08	0.11	g/	g/	0.09
mg/l S	1/14/74	.46	0.3	.48	0.48	g/	.43
	2/26/74	.35	0.5	.3	.28	0.14	.31
Average[f]		.29	0.29	.29	.38	.14	.27
SUSPENDED SOLIDS	10/25/73	19	20	50	g/	g/	26
mg/l	1/14/74	265	160	320	210	g/	239
	2/26/74	160	240	190	110	105	161
Average[f]		148	140	187	160	105	142
TEMPERATURE	10/25/73	g/	g/	g/	g/	g/	g/
°F	1/14/74	60	60	65	65	g/	63
	2/26/74	65	56	54	44	50	54
Average[f]		63	58	58	55	50	58
TURBIDITY	10/25/73	85	85	98	g/	g/	89
FTU's	1/14/74	510	285	410	460	g/	416
	2/26/74	340	450	200	280	230	300
Average[f]		312	273	236	370	230	268

a/ Bayou Plaquemine Brule at Quebodaux Ferry, West of Crowley.
b/ Bayou Plaquemine Brule at Highway 13 Bridge, North of Crowley.
c/ Bayou Plaquemine Brule at Highway 367 Bridge, Northwest of Rayne.
d/ Long Point Gully at Highway 98 Bridge.
e/ Bayou Wikoff at Highway 35 Bridge, North of Rayne.

f/ Average reading for sampling period and does not reflect annual average.

g/ Data not available.

PESTICIDE RESIDUE CONCENTRATIONS
Bayou Plaquemine Brule Watershed[a/]
1973

	BHC Alpha (ppm)	P, P′-DDD (ppm)	P, P′-DDE (ppm)	P, P′-DDT (ppm)	Dieldrin (ppm)	Toxaphene (ppm)
STATION NO. 1[b/]						
Fish[e/]						
Bluegill	0.02	0.07	0.12	0.06	0.17	0.38
Crappie	.01	.05-.17	.04-.16	.04-.17	.07-.16	.27-1.66
Sediment	f/	0.07	0.02	g/	g/	f/
Water	f/	f/	f/	f/	f/	f/
STATION NO. 2[c/]						
Fish[e/]						
Bluegill	g/	0.05	0.05	0.07	0.04	g/
Gizzard Shad	g/	.04	.11	.07	.04	0.30
Sediment	f/	0.08	0.03	0.01	0.01	f/
Water	f/	f/	f/	f/	f/	f/
STATION NO. 3[d/]						
Fish[e/]						
Gar	0.02	1.19	0.74	0.76	0.57	4.20
Sediment	f/	0.04	0.01	0.08	0.01	f/
Water	f/	f/	f/	f/	f/	f/

a/ Samples collected by Soil Conservation Service biologist; analysis performed by Feed and Fertilizer Laboratory, Louisiana Agricultural Experiment Station-Louisiana State University, Baton Rouge.

b/ Bayou Plaquemine Brule at Quebodaux Ferry, west of Crowley.

c/ Bayou Plaquemine Brule at Highway 13 Bridge, north of Crowley.

d/ Bayou Plaquemine Brule at Highway 367 Bridge, northwest of Rayne.

e/ Fish were dressed and skinned.

f/ No results received.

g/ No chlorinated hydrocarbons detected at 0.01 ppm.

SETTING

Bayou Plaquemine Brule upstream from Louisiana Highway 98 has 16 miles of intermittent ~~flow; Deep Gully has~~ 1 mile of intermittent flow. Bayou Plaqumeine Brule in this reach is 15 to 100 feet wide and 3 to 20 feet deep. The intermittent channels have an estimated 25 pounds of fish per acre. The remaining reaches have ephemeral flow.

Public access to Bayou Plaquemine Brule is available at three boat launching ramps and most road crossings. Access to the other fisheries is limited to roads. Some of the ponds do not have access by all-weather roads.

The existing fisheries of the watershed are used moderately. Commercial fishermen use Bayou Plaquemine Brule more than sport fishermen because it has more commercial fish than sport fish. However, sport fishermen use the lakes and ponds frequently. Residents of Acadia and St. Landry Parishes bought 9,168 fishing licenses for the 1970-71 season.[13/] Although these fishing licenses were sold in these two parishes, most of the fishermen went outside of the watershed to fish such places as Toledo Bend Reservoir, Cocodrie Lake, Henderson Lake, and the Gulf of Mexico.

No fish species or subspecies that is suspected of being in danger of extinction inhabits the watershed.[14/]

Wildlife Resources

The three major types of wildlife habitat in the watershed are forest land, open land, and wooded channel banks. The watershed contains an estimated 25,100 acres of forest land. Game species such as white-tailed deer, squirrels, rabbit~~s~~, woodcock, and waterfowl inhabit the forest land. The Louisiana Wild Life and Fisheries Commission plans to stock wild turkey in Acadia Parish in 1974. Forest land also provides habitat for many nongame animal species that serve important ecological functions.

All of the Type 1 wetlands in the watershed are in the forested flood plains of Bayou Plaquemine Brule, Bayou Blanc, Bayou Jonas, Long Point Gully, and Bayou Wikoff. Herbaceous species in these wetlands may include chufa, redroot cyperus, fall panicum, smartweed, and wild millet. All of these provide important waterfowl food.

13/ Louisiana Wild Life and Fisheries Commission, 14th Biennial Report 1970-71 (New Orleans: Louisiana Wild Life and Fisheries Commission, 1972), p. 28.

14/ Robert R. Miller, "Threatened Freshwater Fishes of the United States," Transactions of American Fisheries Society, No. 2 (Kansas City: Allen Press, 1972), pp. 239-252.

Rice field flooded in winter for waterfowl feeding habitat

Forest land habitat

Edge effect between cultivated field and rotation pasture

Brushy field border

SETTING

Populations of forest games species other than deer are near the carrying capacity of the habitat. Populations of white-tailed deer should increase if the present level of protection is maintained. Improper cutting of mast-producing hardwoods has reduced the food supply for game species.

The watershed contains an estimated 187,100 acres of open land, including cropland and pastureland. Open land provides primary habitat for quail, doves, snipe, waterfowl, rabbits, and other wildlife species. Populations of open land game species are near the carrying capacity of the habitat.

Cultivated areas such as rice and soybean fields provide excellent feeding grounds for quail, doves, ducks, and geese. Brushy fence rows provide cover for rabbits, quail, and songbirds. Rice-rotational pastures are temporarily productive habitat for species that feed in open land. Fields used in rice rotations do not usually remain out of cultivation for more than 3 years. Strips of woody vegetation along channels in open land provide cover and nesting areas for open land species. This type of habitat is termed "wooded channel banks."

The Type 5 wetlands, occurring throughout the watershed, are in small acreages ranging in size from 5 to 26 acres. Criteria for Type 5 wetlands are described in Circular 39. They are shallow, fresh water ponds and reservoirs from 3 to 10 feet deep. They are open water areas which are fringed by a border of emergent vegetation. Aquatic vegetation usually present are pondweeds, naiads, coontail, watermilfoils, spatterdocks, stonewarts (chara), lotus, and water-hyacinth. This vegetation serves as food and cover for waterfowl and other wildlife. The fringe of emergent vegetation is high quality nesting habitat for the mottled and fulvous tree duck and it is a good source of cover. Also, Type 5 wetlands are used extensively as brooding areas, especially in midsummer or years with dry spring seasons when the less permanent wetlands are dried out.

Populations and distribution of fish and game in the watershed are listed in the tabulation on the following page.

The estimated 12,700 acres of forest land along Bayou Plaquemine Brule and its tributaries downstream from Louisiana Highway 98, provide some of the best forest habitat in the watershed for animals such as swamp rabbits, squirrels, deer, woodcock, wood ducks, and furbearers. Forest land in this area averages about one-half mile wide. Water oak, baldcypress, water tupelo, overcup oak, blackgum, and willow oak are the predominant species in the flood plain.

Almost 8,000 acres of Type 1 wetlands in the lower reach of Bayou Plaquemine Brule provide valuable habitat for waterfowl and furbearers. Wood ducks are more numerous downstream from Highway 13

CURRENT ESTIMATED GAME POPULATIONS [a]

Species	Animals/Acre	Habitat Type & No. of Acres		Total Population
Dove (Migratory)	3/1	Open Land	187,100	561,300
Quail	1/8	Open Land	187,100	23,387
Rabbit	1/3	Open Land & Forest Land	212,200	70,733
Squirrel	1/1	Forest Land	25,100	25,100
Deer	1/220	Forest Land	25,100	114
Waterfowl (Migratory)[b]	c/	Open Land, Forest Land, & Water Areas	212,342	23,488
Waterfowl (Resident)	d/	Open Land, Forest Land, & Water Areas	212,342	2,662

a/ Game population data developed in cooperation with the Louisiana Wild Life and Fisheries Commission.
b/ Migratory waterfowl population depends upon breeding success and other favorable conditions in Canada and northern United States.
c/ One bird per 8 acres of open land
One bird per 250 acres of forest
d/ One bird per 75 acres of open land
One bird per 150 acres of forest

CURRENT ESTIMATED STANDING CROP OF FISHES

Category	Acres	Standing Crop/Acre	Pounds of Fishes
Ponds and Lakes	142	150	21,300
Intermittent channels	251	25	6,275
Ponded water	89	70	6,230
Perennial channel (Bayou Plaquemine Brule)[a]	290	130	37,700
Total			71,505

a/ Actual standing crop averages of two fish population by Louisiana Wild Life and Fisheries Commission personnel.

than in other forest land. The numerous cypress trees with cavities along this reach are good nesting sites for the wood ducks.

The drainage area entering Bayou Plaquemine Brule downstream from Louisiana Highway 98 contains an estimated 44,800 acres of open land used mostly for cropland and pastureland. Lightly grazed rice-rotational pasture provides good habitat for quail and rabbits; overgrazed pasture usually provides habitat for doves. Cultivated areas such as rice and soybean fields provide feeding areas for upland game birds and waterfowl. Brushy fence rows and wooded channel banks provide habitat for rabbits, quail, and songbirds.

The remaining portion of the watershed contains 12,400 acres of forest land and 141,900 acres of open land. The vegetation and wildlife species density in this open land is similar to those of the other open land. However, forest lands generally decrease in width and habitat quality, and forest land wildlife species generally decrease in density, in an upstream direction.

Access to the existing wildlife resources is limited. All-weather roads provide access to the majority of the area, but most of the land is privately owned and some is posted. There are no State wildlife management areas within the watershed. However, Thistlethwaite Game Management Area is located within a short driving distance. Permission to hunt on some of the private land can be obtained by asking the landowner.

Wildlife resources are well utilized with the migratory species such as ducks, geese, and doves receiving the most hunting pressure in this area. Small game hunting such as squirrel, rabbit, and quail hunting is a popular form of outdoor recreation for the local residents. Acadia and St. Landry Parishes sold 13,835 basic resident hunting licenses and 3,088 big game licenses for the 1970-71 hunting season.[15/]

"Endangered" wildlife species that may be present are the red wolf alligator, Bachman's warbler and the Southern bald eagle.[16/] Bachman's warbler and the Southern bald eagle are migratory species. "Endangered" species are those species that are on the verge of extinction. Nearby Lake Arthur is good habitat for the Southern bald eagle, which is a fish-eating bird.

15/ Louisiana Wild Life and Fisheries Commission, op. cit., p. 26.

16/ U.S. Department of Interior, Fish and Wildlife Service, United States List of Endangered Fauna, (Washington: U.S. Government Printing Office, 1974).

Recreational Resources

A 1970 inventory conducted by the Louisiana State Parks and Recreation Commission lists 17 recreation sites in the watershed, all in Acadia Parish. Some are in the "general outdoor" class and the remainder are in the "high density" class, according to the Bureau of Outdoor Recreation's land classification system. Facilities at the sites include baseball diamonds, basketball courts, tennis courts, swimming pools, picnic tables, and boat launching ramps. The sites have good public access and are used moderately.

Water quality analyses have shown no major pollution problems other than suspended sediment and its associated high turbidity, color, and rate of sedimentation within the watershed. Pollution of channels by suspended sediment is prevalent following rainstorms that cause sheet erosion of cultivated land. Localized water and air pollution is caused by improper waste disposal.

The lower 19 miles of Bayou Plaquemine Brule was included as navigation channel improvement by the River and Harbor Act of June 25, 1910. Commerce averaging in excess of 16,000 tons per year has been reported each year since 1966.

Archaeological and Historical Resources

The Curator of Anthropology and the Louisiana Historic Preservation Officer have been contacted concerning known archaeological and historical sites within the watershed. The National Register of Historical Places was also reviewed. No known historical sites are on record within the watershed.

The Soil Conservation Service contracted with Louisiana State University to conduct a survey in order to determine the existence of any archaeological or historical sites that would be affected by the installation of structural measures. This survey is complete.

No archaeological or historical sites were discovered by this survey that are located within the area to be disturbed by the installation of structural measures.

Soil, Water, and Plant Management Status

Soybeans became a popular crop in the middle 1960's. The acreage in Acadia and St. Landry Parishes increased from 64,000

in 1965 to 162,000 in 1970.[17] Soybean acreage in the problem areas of this watershed is approximately 46,700. Rice, pasture, and a small amount of forest land were replaced by the soybeans.

The forest land is all individually owned. Relatively high marketing costs depress stumpage prices. Timber sales provide small supplementary income to the owners.

The watershed is in the Acadia and the St. Landry Soil and Water Conservation Districts. Soil and water conservation plans have been prepared for 927 district cooperators on 156,585 acres, or 67 percent of the watershed. An estimated 21 percent of the needed conservation measures have been applied, thus adequately treating 48,400 acres. During the last 10 years, landowners have applied conservation measures costing approximately $3,398,000 (see table 1A) on water problem areas as well as nonproblem areas.

The Soil Conservation Service personnel work closely with the soil and water conservation districts in establishing priorities of work to be done in promoting conservation. The districts announce important activities through newsletters, radio, television, and newspapers. They employ three district aides, a technical aide, a clerk, and a secretary to assist Soil Conservation Service field office personnel. The districts are also actively involved in broad resource planning and cooperate with various planning bodies.

17/ Lonnie L. Fielder and Clarence O. Parker, Louisiana Crop Statistics by Parishes Through 1970, D.A.E. Research Report No. 436 (Baton Rouge: Louisiana State University and Agricultural and Mechanical College, April 1972), table 4.

WATER AND RELATED LAND RESOURCE PROBLEMS

Land Treatment

Soils in the watershed have comparatively low natural fertility, but crops respond well to good management. Because of the nearly level terrain, high rainfall, and slow soil permeability, severe wetness and flooding problems exist.

Rice is usually grown in rotation with soybeans or pasture. Rotations periodically interrupt weed buildup in rice and restore desirable soil conditions. Where wetness and flooding are serious problems, recommended pasture management practices cannot be effectively applied, thereby resulting in poor grazing distribution. Weeds increase, and some areas are so overgrazed that sheet erosion increases.

On other cropland, planting is often delayed in the spring because fields are wet or flooded. In order to decrease land preparation time, many farmers plow their land in the fall after crops are harvested. This allows them to plant earlier the following spring, but it removes crop residues that would serve as soil-protecting mulch. Impact of raindrops on the bare ground detaches soil particles (splash erosion). Runoff removes some of the particles (sheet erosion) and deposits them downstream (sediment deposition or sedimentation).

Many farms have adequate drainage systems which would function properly with adequate outlet channels. Proper drainage would allow farmers to realize increased economic benefits from conservation measures. Some landowners and operators have installed on-farm and group drainage systems with the help of the Acadia and the St. Landry Soil and Water Conservation Districts; however, the entire system of outlets for these smaller systems cannot dispose of the excess water properly.

Floodwater Damages and Drainage Problems

Floodwater and drainage problems are inseparable in the agricultural areas. Flooding from storm runoff aggravates and prolongs wet soil conditions in the nearly level terrain, as illustrated by photographs on the following page. Drainage is defined as the removal of excess subsurface or surface water from high water tables or normal precipitation. Flood prevention is defined as the conveyance, control, and disposal of surface water caused by abnormally high direct precipitation or stream overflow. Because of the flatness of the watershed, the wetness of the soil, and the high annual rainfall, water problems are closely interrelated.

Flooding of Crops

Crop Damage Caused by Poor Drainage

For instance, an abnormally high rain may occur which saturates the soil. Before soil moisture conditions are reduced sufficiently to allow work, a normal rainfall occurs which again saturates the soil and prolongs the excess moisture problem. Channels in the problem areas are not adequate to prevent frequent, direct damages from flooding or to allow on-farm drainage systems to function properly.

This watershed, served by an estimated 396 miles of channels, has been identified by the Sponsors as having inadequate drainage and flood problems. These channels are classified according to the type of channel and flow condition. The classifications are shown as follows:

Type of Channel	Miles
Well-defined natural channel	2
Previously-modified or manmade channel	394
Total	396

Flow Characteristics	
Ephemeral	294
Intermittent	62
Ponded Water	16
Perennial	24
Total	396

The average annual rainfall is 60 inches. Rainfall of at least 4 inches in 48 hours occurs at an average rate of twice a year, 5.1 inches once a year, and 6.9 inches once in 3 years.

Average annual agricultural damages caused by floods with average recurrence intervals of not more than 3 years are greater than from larger, less frequent floods. Damaging out-of-bank flows occur in portions of the area at an average rate of twice a year.

Most of the cultivated land has been in crops for many years. Normal deterioration of channels and increased storm runoff caused by a change in crop rotations from rice-pasture to rice-soybeans has rendered drainage systems inadequate.

Excess water causes delays and difficulties in planting, cultivating, and harvesting that require additional use of equipment and labor. The delays also reduce crop yields and quality.

The estimated average annual "present" yields per acre are 24 bushels of soybeans, 24 barrels of rice, 120 crates of sweet potatoes, 495 pounds of lint cotton, and 40 bushels of corn. Pasture yields range from 40 pounds of beef per acre on rice-rotational pasture to 225 pounds on improved pasture and average 85 pounds.

Rice will be used to illustrate the water problems in the watershed because it is the main cash crop. Research has shown that rice planted in March or April is higher yielding than rice planted in May or June.[1/] Therefore, when wet conditions cause long delays in planting, yields are low. When the weather does permit early planting and rain later causes flooding before the rice plants are large enough to tolerate the high water, seedling population survival is reduced. If the farmer decides not to replant, the thinly-spaced rice produces less than a full stand would produce. The farmer often keeps the existing crop because he runs the risk of having the same problem occur after he replants.

In some areas, floodwaters back into the fields and break irrigation levees. If these levees are not repaired, irrigation to control weeds is impossible. Repair of these levees requires additional labor and other expenses.

Storms and poor drainage at harvest time can affect quality enough to lower prices received. The items significantly affecting the price received for rough rice are head rice and grade.

Head rice includes unbroken kernels and those broken kernels equal to or greater than three quarters of the size of an unbroken kernel. The main reason for the kernels breaking is grain deterioration after maturity. This often happens when large rains occur at the time rice is ready to harvest. Winds during rainstorms cause the rice stalks to lodge and lie in the water, and poor drainage causes the rice to remain wet for long periods. This wetness causes the moisture in the rice to be more than the allowable limit. Therefore, harvest has to be delayed and the rice becomes overripe. Level 1 of head rice, which is equal to or less than 79.9 pounds per barrel, can cause a decrease in price of as much as $0.70 per barrel. Level 5 of head rice, which is equal to or greater than 110 pounds per barrel, can cause an increase in price of as much as $0.55 per barrel.

Factors significantly affecting grade are weed seeds, damage, red rice, and chalk. The grade is usually determined by the factor having the lowest rating. For example, if a lot had three factors

---

1/ 58th Annual Progress Report, Rice Experiment Station (Baton Rouge: Agricultural Experiment Station, Louisiana State University, 1966), p. 12.

occuring at level 1 (the best) and one factor occurring at level 3, the rice would be assigned grade 3. The average price difference between the highest operative grade (grade 3) and the lowest operative grade (grade 5) is about $0.12 per barrel. The operative grades are those in which the majority of the rice is classed, mainly the middle grades.

Excessive wetness adversely affects grade. Rice which stays waterlogged in the field is damaged by fungi. Depending on the weather, it may sprout or begin to sour and rot. At other times, it will become chalky.

Levees break from flooding and cause delays in the initial irrigation, thus allowing abnormal weed and red rice infestations. Poor drainage, which prevents or delays cultivations and causes herbicides to be less effective, allows weed infestations in soybeans. The weed seeds and red rice produced in the soybean fields multiply the control problems when these same fields are rotated with rice.

Although most of the soils in the watershed are low in natural fertility, they will produce high-yielding crops and forage if properly drained and fertilized. Farmers are reluctant to invest in higher inputs of production when risks of loss are high.

Other crops, especially cotton, soybeans, and sweet potatoes, are adversely affected by wetness. Prolonged wetness forces farmers to plant late and harvest late. The late harvest is more costly and has lower quality than earlier harvest. Instead of leaving crop residues on the ground or planting cover crops to protect the soil from winter rains, farmers attempt to plow after harvest. This plowing allows early seedbed preparation in the spring. Where good drainage exists, farmers are encouraged to maintain a good soil cover in winter because they usually have ample time for seedbed preparation in the spring.

Flooding causes some roads to be impassable at times, thereby interrupting farming operations and use by local residents. Interruptions and alterations of school bus operations cause delays and school absenteeism to increase. Standing water harbors pests and disease vectors such as mosquitoes. In instances where medical assistance would be required, flooded roads may prevent an individual from receiving timely treatment, resulting in possible loss of life.

Approximately 3 percent of the Bayou Plaquemine Brule flood plain between Church Point and Crowley is open agricultural land that is flooded more frequently than once in 5 years on the average.

PROBLEMS

Although the capacity of the channel in this vicinity is equal to that which would ordinarily be required for adequate drainage and flood prevention in flatlands, the flooding is damaging to crops in the flood plain. The average width of the well-defined flood plain in this vicinity is about 2,000 feet. The depths of out-of-bank flows are greater than they would be if the flood plain were wider, as it would be in a typical flatland watershed. This flood hazard has probably discouraged farmers from clearing large areas of forest land in the flood plain.

Urban flooding is a problem in Crowley and Church Point. A 100-year flood in Crowley would inundate about 60 percent of the area of the town and damage 270 homes (5 percent). The flooding would result from overflow of local tributaries and would be aggravated by high water stages in Bayou Plaquemine Brule. Several streets, residential yards, and the grounds of a school would be subject to damage. Many of the above mentioned properties would also receive lesser damages in smaller storms. A 100-year flood in Church Point would damage 40 homes, 11 commercial establishments, an industrial complex, a rodeo arena, 30 residential yards, and several streets. The flooding would result from overflow of Bayou Plaquemine Brule. Many of the above mentioned properties also receive lesser damages from smaller storms.

In addition to the direct and indirect monetary damages identified in these two towns, other adverse conditions exist as a result of flooding and poor internal drainage. These include (1) health hazards from water standing in yards and under houses, (2) undesirable odors from stagnated water around dwellings, and (3) wading in water to get to and from dwellings.

A petroleum refining plant near Church Point is subject to flooding. If floodwaters overtop a concrete wall which surrounds the main components of the plant as they would during a 100-year storm, an explosion could occur which would endanger the lives of employees and other persons near the plant.

Flooding and inadequate drainage in both of these towns create adverse environmental conditions that affect both the quality of life and social well-being of the residents.

Average annual floodwater damages are $1,322,700. Of this amount, $983,700 are crop and pasture damages, $14,400 are residential damages, $36,700 are commercial damages, $1,400 are industrial damages, $209,100 are road and bridge damages, and $77,400 are indirect damages. Crop and pasture losses because of impaired drainage total to an amount similar to floodwater damages.

Headwater Flooding in Church Point

PROBLEMS

Erosion Damage

Sheet erosion, the removal of soil by the impact of raindrops and the flow of runoff, is the main cause of soil loss in the watershed. The rate of sheet erosion depends on the following factors:

1. Amount and intensity of rainfall,

2. The cover, or protection, from raindrop impact,

3. The physical character of the soil, and

4. The slope of the land and the uninterrupted length of the slope.

Some of the preceding factors do not vary within the watershed. The average amount and intensity of rainfall are similar throughout the watershed. The cover is the same for each land use in the area because the land treatment measures that have been applied are broadly distributed.

Soil and slopes vary between the land resource areas. The two major types are soils of the Southern Mississippi Valley Silty Uplands and soils of the Gulf Coast Prairie. The silty upland soils are composed of fine silty particles less susceptible to erosion than the silty clay loams of the coast prairie. However, the silty uplands soils have surface slopes of approximately 1 percent, and the coast prairie soils have surface slopes of approximately 0.5 percent. The difference in slope accounts for the greater erosion of the silty uplands soils.

Sheet erosion removes approximately 1,140,397 tons of material each year. This amounts to an average of 4.9 tons of soil per year removed from each acre. Average damage to the soils from sheet erosion is barely within tolerable limits. Lack of winter cover due to fall plowing accounts for a considerable portion of this soil loss.

Soil losses from gully, streambank, and roadside erosion are in scattered localities and are insignificant when compared to the soil losses from sheet erosion.

Field with excessive sheet erosion

Field protected from excessive sheet erosion by crop residue

Sediment Damage

Sediment damages on agricultural land are caused by (1) deposition in lower areas of outwash from nearby sheet erosion and (2) deposition by settling out from floodwaters. Reduction of damage from the first cause is accomplished by land treatment and is not normally evaluated in monetary terms.

Damages caused by floodwater deposition are normally assigned a monetary value when the productivity of the soil is affected. The fine-grained sediment derived from the soils of the watershed is deposited as a thin film on flooded lands and vegetation. The resulting damages were grouped with other floodwater damages and were not assigned separate monetary values since they were low.

The primary effect of suspended solids is on quality of water in Bayou Plaquemine Brule and the Mermentau River. As indicated in the graphs in <u>WATERSHED RESOURCES-ENVIRONMENTAL SETTING</u>, samples of water from Bayou Plaquemine Brule had maximums of 32 ppm suspended solids and 510 units of turbidity on the Jackson scale. The samples were taken at three locations on each of three different days in the fall and winter of 1973-74. Water samples taken from the Mermentau River at monthly intervals from 1968 to 1973 had maximums of 290 ppm suspended solids and 300 turbidity units. Estimates of runoff and sediment delivered to the watershed outlet indicate an average suspended solids concentration of 441 ppm. This figure includes, in addition to the colloidal sediment, the larger-sized sediment particles traveling by saltation and the mud flow along channel bottoms. Suspended sediment concentrations will vary widely with (1) season, (2) antecedent moisture, (3) rainfall intensity and duration, and (4) point in time with respect to storm flow. Sediment pollution increases turbidity, which affects the composition of the fisheries in the 24-mile perennial-flow reach of Bayou Plaquemine Brule. As a result, commercial species of fish predominate over game species.

Sediment accumulations develop at some points where sediment concentrations are unusually high and flow velocities decrease drastically in a short distance. Where these deposits are exposed to the air, willow trees grow and reduce channel capacity. The deposits usually occur at points where small, shallow channels enter drainage mains or laterals. Removing the sediment to restore channel capacity adds to the cost of operation and maintenance for the channels and degrades water quality and local aquatic habitats.

Bank erosion caused by sediment bar deflecting current

Drainage ditch dug without adequate technical assistance -
note excessive erosion and absence of berm

Irrigation

Rice is the only crop irrigated regularly. Pasture, soybeans, and other crops may be irrigated occasionally. About half the water used for rice irrigation is ground water from the Chicot Aquifer; the other half is from surface waters, especially Bayou Plaquemine Brule and Bayou Wikoff. Surface water supplies include water released from ricefields upstream. The amount of water used in Acadia and St. Landry Parishes is shown in the following tabulation[2/]

Water Used for Rice Irrigation in 1969
---million gallons per day---

Parish	Ground Water	Surface Water	Total
Acadia	149.77	131.06	280.83
St. Landry	33.54	7	40.54

The water level of the Chicot Aquifer under the watershed was 15 to 20 feet above sea level in 1903.[3/] In 1950, it was 0 to 5 feet below sea level;[4/] in 1960, it was 15 to 20 feet below sea level.[5/] The average rate of decline of the water level was 1.5 feet per year.[6/] The decline was caused mainly by irrigation pumpage in the area. Industrial and municipal pumpage in the Lake Charles area had some influence on the decline.

2/ State of Louisiana, Department of Conservation, Pumpage of Water in Louisiana, Water Resources Pamphlet No. 26 (Baton Rouge: Louisiana Geological Survey and Louisiana Department of Public Works, 1970), pp. 8-9.

3/ Paul H. Jones, A. N. Turcan, Jr., and Herbert E. Skibitzke, Geology and Ground Water Resources of Southwestern Louisiana, Geological Bulletin No. 30 (Baton Rouge: Louisiana Geological Survey, 1954), Plate 17.

4/ Ibid., Plate 29

5/ Alfred H. Hardner, Water Levels and Water-Level Contour Maps for Southwestern Louisiana 1959 and Spring 1960, Water Resource Pamphlet No. 10 (Baton Rouge: Louisiana Geological Survey and Louisiana Department of Public Works), Plate 3.

6/ Allen L. Zack, Ground Water Pumpage and Related Effects, Southwestern Louisiana, 1970 With a Section of Surface Water Withdrawals, Water Resources Pamphlet No. 27 (Baton Rouge: Louisiana Geological Survey and Louisiana Department of Public Works, 1971), Plate 3.

PROBLEMS

Projected requirements for the year 2020 are probably near the maximum which can be supplied from the aquifer. Local problems, such as supplying peak irrigation requirements, will probably develop after the year 2000.[7/]

The soils are well-suited for rice irrigation because of the slow permeability of the subsoil. Subsurface pipelines are beginning to replace open canals in irrigation systems where water losses and associated pumping costs are critical. The following tabulation compares pertinent cost items for surface and subsurface transmission on farms in southwest Louisiana.

Item	Units	Average Annual Per Farm Surface	Subsurface
Investment	Dollars/ft	0.59	3.84
Hand Labor	Hours	88.2	18.0
Machinery and Equipment Maintenance	Dollars	301.36	0
Weed and Grass Control Materials	Dollars	30.40	0
Water Losses	Pumping Hours	166.1	0
Area Returned to Production	Acres	0	3.4
Cost of Closing Surface Canals	Dollars	0	1,096.47
Pumping Time	Hours/acre	7.6	6.4

Source: Willard F. Woolf and Joseph W. Freeland, Cost of Surface Canal Versus Subsurface Pipeline Irrigation Southwest Louisiana Rice Area, D.A.E. Research Report No. 460 (Baton Rouge: Louisiana State University, Department of Agricultural Economics and Agribusiness, 1973), pp. 7-12.

Subsurface pipelines will probably be adopted only in certain situations. Pumpage costs, which are related to the source of water, are an important factor which could influence decisions on systems. Pumping ground water into a delivery system costs more than pumping surface water. Long-term costs of subsurface pipelines should be

---

7/ State of Louisiana, Department of Public Works, Ground Water Resources and Requirements for Louisiana 1970-2020, Comprehensive Water and Related Land Resources Study, Series II, Volume II (Baton Rouge: Department of Public Works, 1971), p. 97.

less than the costs of surface canals when ground water is the source. This is true, for example, when the pipelines have an expected life of 50 years, reorganization of surface canals is scheduled for 15 years, and 7 percent interest is compounded annually on investments. Long-term costs of surface canals would be less under these conditions when surface water is the source.

Another factor which affects decisions on irrigation systems is land tenure. Since operators generally contribute all labor and all or part of the materials to maintain surface canal systems, landowners not farming the land will probably be reluctant to make investments in pipelines.[8/] Subsurface pipelines, which would reduce the amount of irrigation water used about 15 percent, are expected to be installed on 25 to 50 percent of the land during the installation period.

Municipal and Industrial Water

All municipal water is obtained from the Chicot Aquifer. The water is high in total dissolved solids and iron and is relatively hard, but the quality is acceptable. The wells provide an adequate amount of water, and the reservoir will support additional wells. A declining water level is causing an increase in costs of pumping from the aquifer, but an adequate supply exists for the foreseeable future.

Recreation

The estimated 1974 population within a 30-mile radius of the watershed is 343,000. By the year 2020, it is expected to be 473,400, a 38 percent increase. The recreational demands based on the present population are 1,992 tent camping sites, 1,349 trailer camping sites, 2,476 picnicking sites, and 554 boat launching ramps. Subtracting the present supply from present demands indicates a remaining need for 1,992 tent camping sites, 1,239 trailer camping sites, 2,168 picnicking sites, and 492 boat launching ramps.

The area is below average in the quality and quantity of water available for fishing and water sports. The Mermentau River is the only substantial water-based recreation resource near the area. Within 50 miles, however, numerous resources and facilities for water-based recreation are available. These resources include Grand Lake, White Lake, Lake Arthur, Lake Fausse Point, Cocodrie Lake, Chicot Lake, Henderson Lake, and others.

8/ Willard F. Woolf and Joseph W. Freeland, Cost of Surface Canal Versus Subsurface Pipeline Irrigation Southwest Louisiana Rice Area, D.A.E. Research Report No. 460 (BatonRouge: Louisiana State University, Department of Agriculture Economics and Agribusiness, 1973), pp. 7-12.

PROBLEMS

Local interest exists for developing recreational facilities. However, investigations indicate little opportunity exists for developing quality water-related recreational facilities on a scale that would adequately serve public needs.

Fish and Wildlife

The watershed lands support good populations of open land wildlife, especially dove, snipe, killdeer, and waterfowl. Most open land wildlife species are near the present carrying capacity of the existing habitat. Major factors limiting population are (1) lack of protective cover, especially in the winter, (2) lack of suitable nesting habitat, (3) available year-round food supply, and probably (4) increased usage of pesticides. Clearing brush and weeds from fence lines, ditches, levees, and other areas not in crop production has aggravated the problem of insufficient protective cover. Pastureland that is being overgrazed and under-fertilized is providing rather poor habitat for open land wildlife with the possible exception of mourning dove.

The volume of agricultural chemicals applied has increased. Increases in volumes usually lead to increases in the amount of pesticides in the natural environment. Pesticide volumes do not inevitably reflect the amount of actual hazard to wildlife, but they do reflect potential hazard. Real danger depends upon a number of complex, variable, and interrelated relationships between the organisms present, environmental factors, and treatment procedures. The effects of each chemical must be evaluated in terms of (1) type and nature of chemical used and its rate and method of application; (2) species, age, sex, and behavioral patterns of animals present; (3) effects of food - chain and habitat; and (4) the climate, season, and local weather conditions.

Of the many insecticides now being used and occurring in ecosystems, the following are considered more important in their effects on fish and wildlife.9/

1. DDT and its metabolites
2. Dieldrin
3. Endrin
4. Heptachlor
5. Benzene hexachloride
6. Lindane
7. Chlordane
8. Toxaphene

9/ R. E. Johnson, T. L. Carver, and E. H. Dustman, "Residues in Fish, Wildlife, and Estuaries," Pesticides Monitoring Journal, Vol. 1, No. 1 (June 1967), p. 13.

PROBLEMS

Prior to 1968, endrin was used extensively in southern Louisiana, but since that time its use has been sharply curtailed upon the recommendation of the Louisiana State Department of Agriculture. The major herbicides used in the area are (1) propanil, (2) lasso, (3) ordvan, (4) silvex, and (5) 2,4-D.[10/]

Agricultural practices such as spraying insecticides and herbicides can have adverse effects on aquatic environments. Of all the major fish kills in Louisiana during 1967, 51 percent were related to agricultural operations, 34 percent were related to industrial operations, and 15 percent were caused by municipal operations.[11/] A survey of pesticide usage in the watershed during 1973 is shown in the tabulation on the following page. This survey covered approximately 10 percent of the farmland.

Major problems affecting the fisheries in the descending order of importance are (1) poor water quality, (2) limited quantity of water, (3) lack and difficulty of proper management, and (4) rather poor access (launching and parking facilities) to the existing water areas.

Poor water quality is the major problem limiting the quantity (pounds of fish per acre) and quality (size and species of fishes present) of the fisheries. Because of poor water quality, the standing crops of sport fishes (bass, bream, crappie) are low and the standing crops of commercial fishes (catfish, buffalo, gar, freshwater drum, carp) are only moderate. This poor water quality is caused by high concentrations of suspended solids and plant macro-nutrients, high color and turbidity, and probably, contamination by pesticides. Refer to Pesticide Residue Concentrations on page 21. The capacity of channel systems to absorb and diffuse contaminants in water has been lessened by past modification of the channels.

Poor water quality is detrimental in other ways. Organic pollution reduces or eliminates the water's value for activities such as swimming and water-skiing. Water with visible pollution such as turbidity is not aesthetically pleasing to most people. An increase in the quality of the existing water resource should cause an increase in the quality of the fisheries. Also, improving water quality would increase its value for recreation.

Pollution from oil drilling, production, and transportation was a major problem affecting water quality during the late fifties and early sixties. However, because of modern control techniques and

---

10/ D. R. Rowe *et al.*, "Dieldrin and Endrin Concentrations in a Louisiana Estuary," Pesticides Monitoring Journal, Vol. 4, No. 4,

11/ "Pollution Caused Fish Kills - 1967," 8th Annual Report, Federal Water Pollution Control Administration, p. 13.

Pesticide Usage Survey of
Bayou Plaquemine Brule Watershed[a]
1973

PESTICIDE	: Application : rate/acre[b]	: Acres receiving : application[c]	: Percent of farms : using listed : pesticide[d]	: Total volume : applied
FUNGICIDES				
Captan	3½ lbs/ac	5,800	72	20,300 lbs
HERBICIDES[e]				
Alachlor	3 qts/ac	3,495	48	2,620 gals
Fluometuron	2-8 lbs/ac	330	3	9,240 lbs
Linuron	1 lb/ac	1,375	21	1,375 lbs
Molinate	30 lbs/ac	1,160	33	34,800 lbs
MSMA	1-2 lbs/ac	330	3	495 lbs
Nitralin	4 qts/ac	300	9	300 gals
Propanil	4 qts/ac	3,180	51	3,180 gals
Propanil and Molinate (mixed)	3 qts/ac (each)	90	9	330 gals
Trifluralin	1 lb/ac	450	15	450 lbs
2,4-D	1 qt/ac	420	15	105 gals
2,4-DB	2 lbs/ac	100	3	200 lbs
INSECTICIDES[f]				
Aldrin[g]	3½ lbs/ac	5,890	72	20,615 lbs
Carbaryl	1½ lbs/ac	310	6	470 lbs
Carbofuran	17 lbs/ac	755	15	12,835 lbs
Methyl Parathion	1 qt/ac	1,225	21	305 gals
Toxaphene[g]	1 lb/ac	260	3	260 lbs

a/ Data prepared by District Conservationist from a survey of 33 farms, comprising a representative sample of 10 percent of the land area.

b/ Application rates based on average rates used by four local flying services.

c/ No pesticides were used on 7,285 acres; one or more pesticides were used on 12,885 acres.

d/ No pesticides were used on 12 percent of farms surveyed.

e/ Most herbicides are applied only once per crop season.

f/ Number of applications varies, depending upon degree of infestation during crop season.

g/ Denotes chlorinated hydrocarbons.

more rigid enforcement of anti-pollution laws, oil-related pollution is now only a minor problem in the area. It could become a major problem again if control measures were lessened.

The farm ponds are difficult to properly manage for sport fish production because most of them are the "dug-out" type, which usually have no means of water control except pumping out. Standing crop of the fish in these ponds could be increased 50 to 75 percent by improved management. This could be accomplished by restocking, fertilizing, and adequate harvesting. Because of the nearly level topography and intensive land use, the potential for new impoundment to provide additional fish habitat is limited.

Quality of fishery and recreation resources in the watershed is adversely affected by the practice of dumping trash and garbage into the channels at road crossings. This practice, which is increasing as the population increases and becomes more mobile and affluent, creates health hazards, increases water pollution, lowers water quality, detracts from the natural beauty of waterways, and is detrimental to the fishery and recreational resources. Lack of a convenient and efficient solid waste disposal system and public awareness of detrimental effects are the major causes of this problem.

Existing public roads provide adequate access to most permanent water areas. However, improved boat launching facilities and parking areas are needed in order to obtain optimum use of the fisheries. A number of existing launching facilities are at good locations, but they need to be more fully developed.

Access to and utilization of the fishery is inadequate. Public highways provide excellent access by all-weather roads to most of the permanent water areas. However, improved boat launching facilities would encourage optimum use of the fisheries. A number of existing launching facilities are at good locations, but have not been fully developed.

Forest wildlife species include white-tailed deer, rabbits, woodcock, wood duck, squirrels, raccoon, most species of furbearers, and many nongame species. The major problem affecting forest wildlife populations is the limited amount of suitable habitat. Only 11 percent, or 25,100 acres, of the land area is forest land habitat. However, most of the forest land is the bottom land hardwood type which has a high, productive potential for wildlife. The remainder of the forest land is the oak-pine forest type, which normally has a moderate, productive potential. However, this forest type is important to forest wildlife as temporary habitat during periods when the bottom land hardwoods are flooded. The fact that only a relatively small amount of this forest-type remains adds to its importance as forest wildlife habitat. About 48 percent of the forest land is Type 1

wetlands which are extremely valuable to most species of forest wildlife as explained in WATERSHED RESOURCES-ENVIRONMENTAL SETTING. The potentially high productivity and relatively small quantity of existing forest land increases the significance of additional losses. However, only 1,700 acres of forest land were cleared in all of Acadia Parish from 1962 to 1971, which indicates that decreases in forest land will be only a minor problem.

White-tailed deer populations are restricted because of the configuration and relatively small amount of forest land. Wild turkey populations would be affected in a similar manner. Under normal hunting and habitat conditions, turkey require large tracts of forest land in order to maintain large populations. Deer can be maintained on smaller and more dispersed forested acreages. All the significant forest habitat is along the narrow flood plains of Bayou Plaquemine Brule and some of its tributaries. This habitat averages one-quarter mile wide on each side of the bayou, which is near the minimum width necessary to sustain significant deer or turkey populations.

In the past, little if any, timber management or improvement was performed. This is especially true in the bottom land hardwood areas which have been "high graded" for a long time. This practice is detrimental to full timber production and large, healthy forest wildlife populations. It consists of removing higher quality trees and leaving the lower quality trees to produce new timber and wildlife foods. Also, "high grading" often causes a plant species composition change because some timber species are more desirable than others. Forest lands which are properly managed for sustained timber production generally will have more populous, more desirable, and more varied forest wildlife species than poorly managed lands. In view of the lack of interest for forest management on the landowner's part, this resource probably will not be upgraded without combining ownerships.

Road access to the forested areas is generally adequate for hunting and other activities related to forest resources. A possible exception to this is in the vicinity of the watershed outlet at the junction of Bayou Plaquemine Brule and Bayou des Cannes. Posting is limiting access to forest land areas. The amount of posting is expected to increase rapidly.[12/] Landowners are now strongly motivated to reserve areas for hunting and other forest-related recreation. This attitude is a result of increased competition amoung hunters and abuses of property and resources by visiting "sportsmen." Private

---

12/ Louisiana Wetlands Prospectus (Louisiana Advisory Commission on Coastal and Marine Resources, 1973), p. 255.

hunting clubs lease hunting rights from some landowners and post the land to insure hunting opportunities for club members. If the anticipated posting does occur, many local citizens who do not own land and cannot join a hunting club will be deprived of ready access to forest land for hunting, nature study, and other outdoor recreation.

In addition to providing essential habitat to forest land wildlife species, the remaining forest is helpful in preventing further degradation of surface water quality. This, in turn, affects fish, wildlife, and recreational activities in varying degrees.

The forest land and its associated wetland areas act as cleansing agents to help remove pollutants from the water. This is accomplished directly by filtering and absorbing them or indirectly by reducing the water's velocity which causes it to drop part of its suspended solids and their associated pollutants.[13/]

Forest vegetation along channels provides shade, which is essential for a desirable natural aquatic ecosystem. Shade moderates day to night temperature extremes and lowers average annual water temperature.[14/] However, excessive shade, especially in ponded water, can prevent the achievement of maximum photosynthesis by the green aquatic plants. "It is estimated that 25 to 50 percent of full sunlight is necessary for many green aquatic plants to reach maximum phytosynthesis.[15/]

Economic and Social

The level of income necessary for surviving on a minimum diet with none of the amenities of prosperity has been determined by the Social Security Administration[16/] An individual is considered poor if his personal income or the income of his family inadequately provides for his subsistence. In 1960, by this definition, 46 percent and 56 percent of all the families in Acadia and St. Landry Parishes, respectively, were classified as poor. In 1966, 37 and 44 percent were classified as poor in these same parishes. This was an improvement of approximately 9 and 12 percent since 1960. However, 87 and

---

13/ Ruth Patrick, "The Effects of Channelization on the Aquatic Life of Streams," (The Academy of Natural Sciences of Philadelphia), p. 2.

14/ *Ibid.*, p. 6.

15/ U.S. Department of the Interior, Federal Water Pollution Control Administration, *Report of the Committee on Water Quality Criteria*, 1968, p. 48.

16/ James R. Robo and Dean A. Dudley, *Statistical Abstract of Louisiana*, 4th ed. (New Orleans: Division of Business and Economic Research, College of Business Administration, Louisiana State University at New Orleans, 1971), p. 172.

95 percent of all the counties in the United States still had a smaller proportion of poor families. One and two percent of all the families in Louisiana live in Acadia and St. Landry Parishes, respectively. However, 2 percent and 3 percent of all the poor families in the State reside in these parishes.

According to the 1970 census for Acadia and St. Landry Parishes, 31,494 families lived in the two parishes and had a median income of $5,174. Of the total families, 14,680 were urban with a median income of $5,595, 12,254 were rural non-farm with a median income of $4,847, and 4,560 were rural farm with a median income of $4,677. About 31 percent of the urban families had incomes less than the poverty level while 40 percent of the rural nonfarm and 59 percent of the rural farm families had incomes less than the poverty level.

Most of Acadia and St. Landry Parishes' economic conditions are below the State average. Compared with State averages, Acadia and St. Landry Parishes have 19 percent and 21 percent, respectively, more primary individuals who are 65 years of age and over, 2 percent and 49 percent more occupied households which average 1.51 or more persons per room, and 6 percent and 116 percent more occupied households lacking complete plumbing facilities.[17/]

Old age assistance and aid to dependent children are the two largest recipient groups of welfare aid in Acadia and St. Landry Parishes. Of the total public welfare assistance grants made in fiscal year 1968-69 in these parishes, 60 percent were for old age assistance, 24 percent were for aid to dependent children, 12 percent were for disability assistance, 2 percent were for general assistance, and 2 percent were for aid to the needy blind. About 43 percent of the parishes' population were under 18 years old and 9 percent were 65 years old and over.[18/] Information from the 1970 census reveals that 12 percent of the people over 25 years old had never completed 1 year of school and 18 percent were high school graduates. The median for years of school completed was 8. The preceding statistics for the two parishes were considered to be representative of the watershed.

A trend of increasing farm sizes and decreasing number is continuing in the watershed. According to 1969 Census of Agriculture data, Acadia and St. Landry Parishes had 4,317 farms or 28 percent less than in 1964. The average farm sizes in Acadia and St. Landry Parishes increased from 176 and 83 acres, respectively, in 1964 to 231 and 117 acres in 1969. Increased production costs and relatively

---

17/ Fred M. Wrighton and Barbara H. Denton, "Population and Housing Correlates of Poverty in Louisiana, 1970," The Louisiana Economy (Ruston: College of Business Administration, Division of Business and Economic Research, Louisiana Tech University, 1971), Vol. IV, No. 2 (May 1972), pp. 2-5.

18/ Robo, op. cit., p. 79.

static prices for farm products until 1973 have caused decreased net returns per acre. Small operators have either been forced to (1) quit farming, (2) expand their acreages, or (3) supplement their incomes with other work. Many of the small farmers have either sold or rented their land. The majority of the remaining small farmers are employed off the farm and are not primarily dependent on the farm for their livelihood. According to the 1969 Census of Agriculture data for the combined parishes of Acadia and St. Landry, about 57 percent of the farms had sales of less than $2,500, 71 percent had sales of less than $5,000, and 79 percent had sales of less than $10,000.

The trend of decreasing number of farms and increasing size is expected to continue in the future. Farmers are trying to raise their income by farming more land. In order to accomplish this, they have to use larger, more expensive labor-saving equipment.

The population of Acadia Parish increased 2,178 and the population of St. Landry Parish decreased 1,129 from 1960 to 1970. The net out-migration was 6,267 and 15,131 persons, respectively, for Acadia and St. Landry Parishes. This was an 11 and 16 percent decrease in the expected 1970 population. The expected 1970 population was calculated by adding births from 1960 to 1970 to the 1960 population and subtracting deaths which occurred during that same time.[19/]

Many of the young adults are leaving the farm to seek employment elsewhere. Increased efficiency of remaining labor through greater mechanization is necessary for survival of the family-type farm.

Other

Watershed residents obtain water for human consumption from wells; they obtain water for livestock from channels, ponds, and wells. These sources are adequate except for the shallow wells which are sometimes affected by drawdown of irrigation wells.

19/ Roger L. Burford and Sylvia G. Murzyn, Population Projections by Age, Race, and Sex for Louisiana and Its Parishes 1970-1985, Occasional Paper No. 10 (Baton Rouge: Division of Research, College of Business Administration, Louisiana State University, 1972).

PROJECTS OF OTHER AGENCIES

Under the provisions of the Rivers and Harbor Act, the U.S. Army Corps of Engineers has completed several projects on the Mermentau River and Bayou des Cannes, which are outlets for Bayou Plaquemine Brule. A flood control project was completed on the Mermentau River in 1952. Projects for navigation purposes were completed on the Mermentau River, Bayou des Cannes and Bayou Plaquemine Brule in 1915, 1935, 1952, and 1965. Seven channel cutoffs are planned on the Mermentau River. Three contracts have been let in Jefferson Davis Parish, and rights-of-way are being obtained for the remaining four in Acadia Parish.

The Louisiana Department of Public Works, in cooperation with the Acadia and St. Landry Parishes Police Juries, has worked 96 miles of channels in the watershed since 1948. The work location included the lower 47 miles of Bayou Plaquemine Brule and 25 miles of Bayou Wikoff. The remaining 24 miles of work was done on laterals of these bayous.

These works by the U.S. Army Corps of Engineers and the Department of Public Works have provided an adequate release outlet for improvements in the Bayou Plaquemine Brule Watershed.

Included as a part of the Southwest Louisiana River Basin study, a USDA Type IV River Basin Study, completed in 1972, were estimates of stage effects from projects of other agencies. Hydraulic routings were made to determine the cumulative effect of existing and potential watershed developments in the Mermentau Basin. These routings assumed authorized projects of the U.S. Corps of Engineers and Louisiana Department of Public Works in place. The effects of all proposed or installed Public Law 566 watershed project measures within the drainage area of the Mermentau River were included in the computation of discharges and stages. Results of these computations indicate no stage changes from without project conditions.

PROJECT FORMULATION

On April 25, 1969, representatives of the 12 drainage districts in the watershed met to discuss their need for a comprehensive and coordinated plan for flood prevention and drainage. They subsequently drafted a watershed application and submitted it to the Acadia and the St. Landry Parish Police Juries and the Acadia and the St. Landry Soil and Water Conservation Districts for their endorsement. The 16 organizations became co-sponsors of the proposed watershed project and their leaders signed the formal application prior to December 11, 1969. One of the drainage districts withdrew later upon discovering that no project channel work was needed within its boundaries. The Louisiana Soil and Water Conservation Committee approved their application on January 6, 1970.

Authorization to provide planning assistance under provisions of Public Law 566 was requested January 26, 1970.

A preliminary wildlife review was held on July 8, 1971. Representatives of the Louisiana Wild Life and Fisheries Commission and the Soil Conservation Service participated in this review. Since planning had not been authorized, only preliminary information furnished in the Sponsors' project proposal was available. A trip report was prepared by Soil Conservation Service and concurred in by Louisiana Wild Life and Fisheries Commission. Both agencies agreed that if project planning should be authorized, they would work together on the planning as applicable.

Watershed planning was authorized on January 24, 1972.

Interested parties and agencies were notified of this authorization. Ten agencies acknowledged receipt of the notification and offered their assistance. The Sponsors notified 13 individuals and agencies of a public hearing on the proposed planning of the Bayou Plaquemine Brule Watershed. The date of hearing was set for March 3, 1972. Local newspapers announced this hearing, explained its purpose, and encouraged all interested individuals and agency representatives to attend and participate. Sixty-eight people attended this hearing. In attendance were the Mayor of Crowley, one State representative, one State senator, and representatives of the 16 original sponsors, U.S. Fish and Wildlife Service, Farmers Home Administration, Agricultural Stabilization and Conservation Service, Louisiana Intracoastal Seaway Association, Louisiana Department of Public Works, Louisiana Wild Life and Fisheries Commission, Civil Defense, Southwest Louisiana State School, Louisiana Wildlife Federation, Crowley Post Herald, Crowley Daily Signal, and Soil Conservation Service.

The status of the project and the events concerning it were reviewed. After opening remarks by the meeting chairman and representatives of the Louisiana Department of Public Works and Soil Conservation Service, a preliminary report was read. Full public expressions of viewpoints were solicited from all in attendance. Eighteen people took part in the lengthy discussions that followed this invitation. The Louisiana Wild Life and Fisheries Commission and the U.S. Fish and Wildlife Service agreed to assist and work with the Louisiana Department of Public Works and the Soil Conservation Service in the planning process. Estimates were made of planning time required.

The Sponsors indicated their readiness to proceed with the plan and inquired what could be done to speed up this process.

Letters from the Mayor of Crowley and Louisiana Wildlife Federation were read by the meeting chairman and recorded as part of the minutes of this hearing.

The Sponsors prepared a draft work outline on March 2, 1972 and finalized it on April 7, 1972. Representatives of Louisiana Wild Life and Fisheries Commission, U.S. Fish and Wildlife Service, Louisiana Department of Public Works, and Soil Conservation Service assisted in preparing this outline.

By letter dated April 19, 1972, the Louisiana Wild Life and Fisheries Commission made several general comments and recommendations regarding fish and wildlife and requested their consideration during planning. The U.S. Fish and Wildlife Service made similar informal comments by a letter dated May 3, 1972. The Louisiana State University Rice Experiment Station and the St. Landry Police Jury wrote letters to the involved soil and water conservation districts expressing their plans for carrying out a sound land treatment program on public lands under their control. Easement values of land rights-of-way were established by the Sponsors and transmitted to Soil Conservation Service May 8, 1972.

A public meeting to review the results of preliminary studies of alternatives and future courses of action was held at the Federal Building in Crowley, Louisiana, on December 20, 1972. Representatives of the Sponsors, city of Crowley, Acadia Parish Agricultural and Conservation Service, Louisiana Department of Public Works, and Soil Conservation Service were present.

The alternatives discussed were (1) urban flood protection for Church Point and adequate drainage and flood protection for agricultural land including that in the flood plain of Bayou Plaquemine Brule below Church Point, (2) flood protection for Church Point and adequate drainage and flood protection for agricultural land excluding that

in the flood plain of Bayou Plaquemine Brule below Church Point, and (3) alternative 2 above plus the channel work required to reduce flood stages on Bayou Plaquemine Brule in the vicinity of Crowley. The Sponsors voted to accept alternative 2 as the most desirable plan that would provide the best combination of agricultural and urban protection with minimal environmental damage. These three alternatives are discussed further in this section under Alternatives.

A follow-up meeting with the Sponsors was held at the Federal Building, Crowley, Louisiana, on March 12, 1974. Representatives of the Sponsors, city of Crowley, Louisiana Cooperative Extension Service, and Soil Conservation Service were present. Details obtained from more specific studies of alternative 2 were explained and reviewed. Following this review and discussion, representatives of the Sponsors reiterated their approval of this alternative.

The Soil Conservation Service, Louisiana Wild Life and Fisheries Commission, and the U. S. Fish and Wildlife Service met again on March 13, 1974. The purpose of the meeting was to review (1) proposed structural measures, (2) the effects that these measures would produce, and (3) modification of installation procedures and installation of additional structural measures to minimize adverse effects. The modifications and additional structural measures were compared to those suggested by both wildlife agencies during earlier field trips. Additional comments and recommendations were solicited after this comparison. No further suggestions for modifications were received from the representatives of these two agencies.

Another public information meeting was on March 21, 1974 in the Acadia Parish Courthouse. The meeting, having been announced in local and area newspapers, was attended by 52 people. Seven representatives from Federal agencies, 5 from State agencies, 16 from local sponsors, 1 from a local newspaper, 1 from the Sierra Club, and 22 other interested individuals were present. Although statements were made discussing other alternatives, no opposition was expressed against the planned project.

The Louisiana Historical Preservation and Cultural Commission and the Curator of Anthropology at Louisiana State University were contacted to obtain the locations of places of historical or archaeological importance. The Forest Service assisted in the survey of forest land needs and in the watershed plan formulation.

Bayou Plaquemine Brule Watershed was listed as a high priority watershed in the Southwest Louisiana River Basin Report. Purposes identified in this study were evaluated during work plan development.

FORMULATION

Objectives

Cropland and pastureland in the watershed are farmed intensively. Landowners and operators are concerned about damages in important agricultural areas as a result of flooding and inadequate drainage. The Sponsors' watershed application and interest displayed at meetings indicate their desire to improve economic conditions. They requested formulation of a project that would allow increased development of all available soil and water resources.

The Sponsoring Local Organization and the Service agreed to develop a plan with the following objectives:

1. Provide improved farming conditions to increase farm family incomes and improve living conditions

2. Reduce average soil loss to the minimum consistent with sound conservation farming methods

3. Provide agricultural land a substantial increase in level of protection from flooding and wetness problems in order to increase economic returns

4. Facilitate achieving the project objectives by accelerating the going land treatment program so that about 74 percent of the agricultural land will be adequately treated by the end of the project installation period

5. Install project measures in a manner which will be least damaging to wildlife habitat. Measures will be installed to minimize losses to fish and wildlife where applicable.

6. Provide protection in urban areas of Church Point and Crowley from significant damages in the 100-year frequency storm.

Environmental Considerations

Effects of the structural measures on fish and wildlife habitat were considered. To discourage clearing, channels were designed in such a way that forest land is provided a lesser degree of protection than open land. The design procedure is explained in the Hydraulic and Hydrologic Investigations section. The effects of three different levels of protection on the environment were considered.

Design features to minimize adverse impacts of fish and wildlife habitat were considered. These include:

1. Avoid excavation in forest land

2. Limit excavation required in forest land to the side of the channel with the poorer quality habitat

3. Avoid excavation in perennial and intermittent channels

4. Terminate excavation on channels in advance of their confluences with Bayou Plaquemine Brule or Bayou Wikoff

5. Seed disturbed areas with plants beneficial to wildlife

6. Install low-level weirs to minimize damages to the fisheries in ponded, intermittent, and ephemeral channels.

The side on which habitat will be preserved was considered in planning and will be determined at the time of construction by the Soil Conservation Service in consultation with the Louisiana Wild Life and Fisheries Commission and the U.S. Fish and Wildlife Service.

Erosion and sediment in channels were important considerations and measures were incorporated into the plan to reduce adverse effects. Short sections of channels will be made deeper, at the junctions of principal laterals and main channels for sediment interception. Vegetation on berms, spoil, and channel side slopes will be established and maintained. Structures for water control will be installed to trap sediment, create 12 miles of additional ponded water in project channels, and reduce soil erosion.

Other design features and construction methods included to reduce erosion and sedimentation from the channels are:

1. Channels were designed by limiting velocities and selecting appropriate side slopes according to the characteristics of materials to be encountered during construction.

2. Channels were designed to terminate far enough upstream to allow undisturbed vegetation to act as a filtering agent for sediment between the works and outlet channels.

The downstream effects of project measures on peak stages were analyzed. The results of this analysis are shown in EFFECTS OF WORKS OF IMPROVEMENT.

Alternatives

Land Treatment Only - The major land treatment measures that could be installed are conservation cropping systems, crop residue management, land smoothing, drainage mains and laterals, drainage field ditches, pasture and hayland management, pasture and hayland planting, wildlife wetland habitat management, and wildlife upland

habitat management. These measures could only be installed to adequately treat about 5,000 acres that have little or no damage from flooding and inadequate drainage. The installation cost would be about $135,000. Land treatment could also be installed on marginal land, but the effectiveness would be limited because of inadequate protection.

The selection of land treatment measures is dependent on the soils and the planned crops. Soils that have a wetness problem and are used for row crops, such as cotton and soybeans, require the timely removal of surface water and the improvement of internal drainage. These soils normally have slow permeability that severely restricts percolation and lateral movement of water in the root zone. Drainage field ditches, drainage mains and laterals, structures for water control (pipe drops), and land smoothing or land leveling will accomplish the timely removal of surface water where adequate outlets are provided. These measures, combined with crop residue management and conservation cropping systems, also improve the tilth of the soils and remove excess surface water. A complete program is required for maximum benefits of any land treatment measures.

This alternative would not eliminate the need for adequate outlets for on-farm drainage systems. Therefore, the installation of land treatment only would not provide the desired benefits of the project.

Land Use More Tolerant to Wet Soil Conditions - A crop which could be more extensively used in rotation with rice is crawfish. The production of these crustaceans fits in well with rice culture. Rice levees constructed to hold irrigation water also serve as embankments which can turn ricefields into crawfish ponds. Plant stubble and chaff left after the rice harvest serve as food for the crawfish. Irrigation systems used for rice production serve as a source of water for the ponds.

The topography of the area is nearly level which provides very slow surface runoff without some artificial water conveyance system to accelerate water flow. Most of the soils are very slowly permeable and possess a high water holding capacity. These conditions are conducive to nonstructural land use alternatives that could include crawfish farming and pastures with water tolerant native grasses.

Commercial crawfish production in the rice area began in the late 1940's or early 1950's. In 1973, 20 farms had 1,100 acres in crawfish ponds in Acadia Parish and 2 farms had 600 acres in crawfish ponds in St. Landry Parish.

There are 55,600 acres of land in this watershed presently being used for the production of rice, rice rotational pasture, soybeans, cotton, corn, and sweet potatoes which could be converted to crawfish or native pasture. An estimated 17,000 acres of rice and 5,300 acres

of rice-rotational pasture would be suited for crawfish production. Some 23,400 acres of soybeans, 4,800 acres of cotton, 2,100 acres of corn, and 3,000 acres of sweet potatoes could revert to native vegetation.

The present net returns are estimated to be $6,448,000 with the present land use distribution that is on the land. The alternative discussed above would return an estimated $4,391,000 or an estimated loss in net returns of $2,057,000 annually.

Floodproofing and Land Treatment - The topography of the watershed is nearly level and problems caused by high rainfall affect large contiguous areas. Establishing levees around individual farms or hydrologic units would be a remote possibility. The high annual direct precipitation would necessitate the installation of pumping plants large enough to remove the water within the leveed areas. In addition, drainage systems within the leveed areas would be needed to convey water to these pumping stations. Floodproofing cropland and pastureland would cost approximately $31,800,000.

The land treatment program would include conservation measures to adequately treat 124,000 acres at a cost of $3,349,300. The conservation measures needed to treat this area would include, but would not be limited to, conservation cropping systems, crop residue management, land smoothing, drainage field dtiches, drainage mains and laterals, pasture and hayland management, pasture and hayland planting, wildlife wetland habitat management, and wildlife upland habitat management. These measures will be installed singly or in combinations as needed. They will reduce runoff, improve water quality and improve the tilth of the soils.

This alternative would not reduce the requirement for a surplus water disposal system. The additional levees with the required channels would result in an environmentally unacceptable alternative.

Channel Work - Three broad alternatives involving channel work were investigated. These were:

1. Bayou Plaquemine Brule and Bayou Wikoff would be enlarged for their entire length. All laterals that drain into these bayous would be enlarged as needed for adequate drainage and flood prevention. This alternative would prevent flooding on the first floors of homes and places of business in Church Point during the 100-year frequency flood, and would provide better farm drainage, but would increase the flood stage at Crowley and further downstream. The total structural measures cost of this alternative would be approximately $9,500,000.

2. Bayou Plaquemine Brule and all laterals enlarged as needed to provide flood protection for Church Point, and adequate farm drainage and flood protection to agricultural land, excluding that in the flood plain of Bayou Plaquemine Brule below Church Point. This would increase the 100-year frequency peak stage on Bayou Plaquemine Brule below Crowley at Bayou Blanc by about 0.2 foot, but would not increase the peak stage in Crowley.

3. This alternative would include all works proposed in Alternative 2 plus additional enlargement of Bayou Plaquemine Brule below Crowley. In order to accomplish this, the channel below Crowley would need to have a minimum bottom width of 500 feet. This would reduce stages on Bayou Plaquemine Brule so that the three laterals that remove floodwaters from Crowley could be enlarged sufficiently to provide a 100-year level of flood protection. The total structural measures cost of this alternative would be approximately $16,900,000.

The Sponsors voted to accept Alternative 2 as the most desirable plan for the project area.

Channel Work and Land Treatment Investigated for Alternative 2 - Various sizes and lengths of channels were studied to determine whether the 1.5-year, 3-year, or 5-year level of agricultural protection would be the most desirable. The effects of each of these levels of protection were evaluated without and with project conditions. The effects of the 1.5-year and 5-year levels were considered to be alternatives and are discussed in this section. The 3-year level of agricultural protection and the 100-year level of urban protection for Church Point on which the project is based is discussed in the EFFECTS OF WORKS OF IMPROVEMENT section.

The land treatment measures to be installed for this alternative would be the same as those discussed under the Floodproofing and Land Treatment alternative. The effects of land treatment would be the same for the 3- and 5-year levels of protection; however, the downstream limitation of the 1.5-year level of protection would reduce the effectiveness of the land treatment program, the amount of land that could be adequately treated, and the amount of land disturbed.

Wildlife habitat changes and effects on animal population were also studied. (See tabulation on the following page.)

Smaller Channels - Providing a 1.5-year level of protection would require about 205 miles of channel work with 1,472,900 cubic yards of excavation. The total installation cost was estimated to be $3,866,200. The annual cost, including operation

EFFECTS OF THREE LEVELS OF PROTECTION ON HABITAT CHANGES AND POPULATION OF FISH AND WILDLIFE SPECIES BAYOU PLAQUEMINE BRULE WATERSHED

Species	Animals[a] Per Acre	Acres	Total Animals	1.5-Year Level of Protection[e] Acres[b]	1.5-Year Animals[b]	3-Year Level of Protection[e] Acres[b]	3-Year Animals[b]	5-Year Level of Protection[e] Acres[b]	5-Year Animals[b]
Dove (Migratory)	3/1	187,100	561,300	+135	+405	+109	+327	+ 87	+261
Quail	1/3	187,100	23,387	+135	+ 16	+109	+ 13	+ 87	+ 10
Rabbit	1/3	212,200	70,733	- 19	- 6	- 76	- 25	-128	- 42
Squirrel	1/1	25,100	25,100	- 79	- 79	- 90	- 90	-100	-100
Deer	1/220	25,100	114	- 79	- 1	- 90	- 1	-100	- 1
Waterfowl (Migratory)	c/	212,342	23,488	- 87	- 2	-140	- 7	-187	- 12
Waterfowl (Resident)	d/	212,342	2,662	- 87	- 2	-140	- 2	-187	- 2

a/ Game populations data developed in cooperation with the Louisiana Wild Life and Fisheries Commission.
b/ Indicates changes because of construction under three levels of protection.
c/ One duck per 8 acres of open land; one duck per 250 acres of forest.
d/ One duck per 75 acres of open land; one duck per 150 acres of forest.
e/ Protection to agricultural land from a storm which is expected to occur on an average of once in this many years.

ESTIMATED STANDING CROPS OF FISHES

Category	Preproject Acres	Preproject Pounds per Acre	Preproject Total Pounds	Postproject[a] Acres	Postproject[a] Pounds per Acre	Postproject[a] Total Pounds
Ponds and lakes	142	150	21,300	142	150	21,300
Intermittent channels	251	25	6,275	252	25	6,300
Ponded water channels	89	70	6,230	89	70	6,230
Perennial water (Plaquemine Brule Bayou)	290	130	37,700	290	130	37,700
Weirs	0		0	33	15	495
Total			71,505			72,025

a/ Effects of project with 3-year level of protection.

and maintenance would be $310,500. The damage reduction would be about 48 percent. Land used for channels would change in the following manner:

1. Land within channels would increase from 661 to 667 acres.

2. Land in berms would increase from 107 to 500 acres.

3. Land in spoil would increase from 261 to 514 acres.

Land used for channels and berms would increase because channel enlargement would require wider berms to serve as maintenance access. Land occupied by spoil would increase because existing and project created spoil would not be spread for channels in most cases.

The land treatment program under this level of protection would include the installation of the necessary conservation measures to adequately treat 59,500 acres. Some conservation measures would be installed on an additional 9,400 acres of cropland and pastureland. The cost would be about $1,607,700. The measures to be installed would include the same features discussed under floodproofing and land treatment.

Type of habitat in which channels are located was categorized according to examples shown in WATERSHED RESOURCES - ENVIRONMENTAL SETTING. Channels located on cropland or pastureland which had no trees or brush on the berms and spoil were categorized as "open land" channels. Channels located in cropland or pastureland having narrow strips of trees or brush on the berms and spoil were categorized as "wooded channel banks." Channels located in forests were categorized as "forest." Land used for channels, berms, and spoil within these three categories would change in the following manner:

1. Open land acres occupied would increase from 726 to 1,250 acres.

2. Wooded channel bank acres occupied would increase from 216 to 280 acres.

3. Forest land acres occupied would increase from 87 to 151 acres.

The increase in wooded channel bank acreage occupied would be a change in wildlife habitat because the berm and one side of the channel would be kept partially free of woody vegetation under the maintenance program; see figures 5 and 6. The acres of spoil disturbed in the wooded channel banks would be allowed to grow back into trees by natural plant succession, and those

in the forest land would be planted back to trees. Out of the 1,681 acres required for channel rights-of-way, 151 acres would be associated with clearing only and 1,530 acres with excavation.

Larger Channels - Providing a 5-year level of protection would require about 233 miles of channel work with 2,127,500 cubic yards of excavation. The total installation cost would be $5,093,300 The annual cost, including operation and maintenance would be $397,700. The damage reduction would be about 82 percent. Land used for channels would change in the following manner:

1. Land within channels would increase from 661 to 792 acres.

2. Land used for berms would increase from 107 to 594 acres.

3. Land used for spoil would increase from 261 to 610 acres.

Land used for channels and berms would increase because channel enlargement would require wider berms to serve as maintenance access. Land occupied by spoil would increase because existing and project-created channel spoil would not be spread for channels in most cases.

The land treatment program would include the installation of the necessary conservation measures to adequately treat 124,000 acres, or 52 percent more than with the 1.5-year level of protection. In addition, 19,500 acres of cropland and pastureland would have some conservation measures applied. The cost would be $3,349,300. The measures which would be installed include the same features discussed under Floodproofing and Land Treatment alternative.

Land used for channels, berms, and spoil within the three categories--open land, wooded channel banks, and forest--would change in the following manner:

1. Open land acres occupied would increase from 726 to 1,484 acres.

2. Wooded channel bank acres occupied would increase from 216 to 333 acres.

3. Forest acres occupied would increase from 87 to 179 acres.

The increase in wooded channel bank acreage occupied would be a change in wildlife habitat because the channel and berm would

be kept partially free of woody vegetation under the maintenance program; see figures 5 and 6. The acres of spoil disturbed in the wooded channel banks and forest land would be allowed to grow back into trees by natural plant succession. Out of the 1,996 acres required for channel work, 201 acres would require clearing only and 1,795 acres would require excavation.

Urban Protection

Three alternatives were considered in Church Point and four alternatives were considered in Crowley for minimizing floodwater problems. The alternative of channel work on Bayou Plaquemine Brule at Church Point is part of the planned project; the alternative of channel work at Crowley was previously discussed in the third broad alternative of channel work.

Floodproofing - This alternative measure would protect buildings but would not significantly alleviate the floodwater damages to streets, yards, and other cultural features, because the extent of flooding would not be changed. The total structural measures cost of this alternative would be approximately $1,400,000 for Crowley and $500,000 for Church Point.

Levee and Pump Off - Constructing a levee around the problem areas at Church Point and Crowley and installing pumps to facilitate internal drainage would require extensive relocations and construction of massive levee sections in parts of the flood plains. The total structural measures cost of this alternative would be approximately $4,500,000 for protection at Crowley and $850,000 for protection at Church Point.

Floodwater Retarding Structure and Channel Work -This alternative consists of approximately 5 miles of channel work in the vicinity of Crowley and a floodwater retarding structure located on Bayou Plaquemine Brule upstream from Crowley. This floodwater retarding structure would provide flood protection for a limited distance downstream. This would reduce stages on Bayou Plaquemine Brule so that the three laterals that remove floodwaters from Crowley could be enlarged sufficiently to provide a 100-year level of flood protection. The estimated structural measure cost of this alternative is $12,085,000.

The structure would require 12,160 acres of land for flowage easements. Relocation of 150 or more families and reconstruction of utility lines, pipelines, roads, churches, and cemeteries would be required. Much of this area is also in bottom land hardwoods that serve as habitat for many forms of wildlife. The fluctuating water levels of the structure would be detrimental to much of this vegetation. The permanent pool would eliminate 1,440 acres of bottom land hardwood habitat.

Reasons for Selecting Works of Improvement

The Channel Work and Land Treatment alternative provided the most practical means of achieving project objectives. Other alternatives would fulfill some of the objectives but have no effect on others.

The Land Treatment Only alternative would reduce sediment but would have little effect on reduction of wetness problems. The Floodproofing and Land Treatment alternative would produce desired agricultural protection but is more costly and less desirable from an environmental and aesthetic viewpoint. Land Use More Tolerant to Wet Soil Conditions such as pasture or crawfish would not produce the desired economic effects although it would be the least damaging to wildlife. The Floodwater Retarding Structure and Channel Work alternative is not economically feasible and is socially unacceptable. Of the three broad Channel Work alternatives, Alternative 1 would increase flood damages in Crowley and the cost of protecting the agricultural land in the flood plain of Bayou Plaquemine Brule below Church Point would exceed the benefits. The added increment of channel work in Alternative 3 would not be economically feasible and would cause excessive damage to fish and wildlife resources.

The tabulation shown below furnishes data to compare the effects of three different levels of protection on land area occupied by channels rights-of-way before and after project construction.

ESTIMATED CHANNEL RIGHTS-OF-WAY
UNDER EXISTING AND ALTERNATIVE PROJECT CONDITIONS

		Level of Protection		
Land Area	Existing	1.5-year	3-year	5-year
	- - - - - - - - - - - acres- - - - - - - - -			
Channel	661	667	733	792
Berm	107	500	550	594
Spoil	261	514	565	610
TOTAL	1,029	1,681	1,848	1,996
Open Land	726	1,250	1,374	1,484
Wooded Channel Banks	216	280	308	333
Forest Land	87	151	166	179
TOTAL	1,029	1,681	1,848	1,996

Sediment and turbidity produced during construction by the three levels of protection would not be significantly different. Although the cross-sectional area varies with level of protection, the exposed channel perimeter varies less in proportion. For example, at two randomly selected design points, the cross-sections necessary to provide the three levels of protection studied would result in wetted perimeters of 23.7, 24.8, and 25.5 feet and 36.7, 38.2, and 40.0 feet, respectively.

The 3-year level of protection requires 229 miles of channel work, 24 miles more than the 1.5-year level of protection, and 4 miles less than the 5-year level of protection. It requires about 1,818,400 cubic yards of excavation, 345,500 (19 percent) more than the 1.5-year level of protection, and 309,100 (15 percent) less than the 5-year level of protection. The clearing of trees within channels for the three levels of protection is essentially the same.

The reduction in damages for the 1.5-, 3-, and 5-year levels of protection is 48, 71, and 82 percent, respectively.

After due consideration and analysis of alternatives, a system of structural measures as shown on the Project Map, Figure 8, was selected. A 3-year level of protection was selected from the alternatives studied as a basis for project formulation.

Approximately 396 miles of channels were investigated. This study indicates that 250 miles of channels should be considered for project action in order to provide the level of flood protection and adequate drainage to achieve the project objectives.

The combination of structural and land treatment measures selected balance environmental and economic factors necessary to achieve the project objectives. Fish habitat, aesthetics, health, and water quality will be improved by the project. Wildlife habitat will be affected as illustrated in the tabulation on page 61. The land treatment measures included in the plan are those necessary to achieve the project objectives of reducing soil loss on cropland, improving farming conditions, and reducing wetness problems.

The alternative of channel work to provide a 100-year level of flood protection for Church Point was chosen because is is the least costly to achieve project objectives and would cause fewer relocations and disruptions.

Four alternatives investigated to provide the town of Crowley with flood protection are (1) extensive channel work of Bayou Plaquemine Brule downstream from Crowley to Bayou des Cannes, (2) construction of a flood retarding structures on Bayou Plaquemine Brule upstream from Crowley, (3) floodproofing, and (4) levee and pump

off. Channel work on the three laterals (drainageways) for Crowley would be necessary in order for either of these alternatives to accomplish this objective. Because of extensive adverse environmental effects, excessive relocations, and costs, no feasible alternative could be developed to provide flood protection for Crowley. The formulated project insures that no additional flood damages will occur in Crowley.

WORKS OF IMPROVEMENT TO BE INSTALLED

Land Treatment Measures

Land treatment measures will be installed in accordance with soil and water conservation plans developed by the land users in cooperation with the Acadia and the St. Landry Soil and Water Conservation Districts. These plans are based on the proper use of soils within their capabilities and the scope of their anticipated use. To establish capabilities and limitations, soils are analyzed and classified by the use of soil surveys.

Soil scientists with the Soil Conservation Service prepare soil maps based on systematic borings. Soils are classified according to texture, structure, color, thickness of each distinct layer, and steepness of slope. The amount of erosion which has taken place and the rate water will move through the soil are estimated. The pH of the soil is determined. The land capability class for each soil is determined. From these capability classes, the conservation measures which will adequately treat the land are determined. Detailed soil surveys will be made on 34,400 acres of land.

A complete land treatment program will be installed on 124,000 acres of cropland, pastureland, and other land during the installation period. The remainder of the cropland and pastureland will have some land treatment measures installed. The major soil and water conservation measures to be installed and their functions are as follows:

Land Treatment Measures	Function
Conservation Cropping System	Growing crops in a sequence that will help control weeds, maintain soil fertility and protect the soil from erosion. Cropping system sequences vary according to needs of each field for protective soil cover. Cover and green manure are included as needed for soil protection and improvement.
Crop Residue Management	Leaving crop residues on the soil surface of cultivated fields to provide soil cover during periods when erosion is critical. Crop residues are used as a mulch to intercept the impact of falling raindrops, thereby keeping soil detachment and nutrient loss at a

Land Treatment Measures	Function
Crop Residue Management cont.	minimum. The tilth of the soil is improved and the water intake of the soil is increased.
Drainage Mains and Laterals	Constructing open drainage ditches designed to remove excess surface and subsurface water in order to improve the plant growing environment.
Pasture and Hayland Management	Using fertilization, weed control, and grazing practices that maintain a good, thick cover of plants on the soil surface to reduce erosion and produce high forage and livestock yields.
Pasture and Hayland Planting	Planting grasses and legumes that will produce large quantities of high quality forage and control erosion. After plants are established, pasture and hayland management practices are used to maintain good cover.
Irrigation Pipeline	Installing underground pipelines and appurtenances in irrigation systems. This allows proper management of irrigation water and prevents erosion and water loss.
Structures for Water Control (pipe drops)	Using structures where the force of flowing water is sufficient to cause erosion. These structures provide a means of lowering the water from a higher elevation to a lower one in a short distance without causing erosion damage.
Land Smoothing	Removing irregularities on the land surface to provide a more uniform surface for irrigation water application, to improve surface drainage, to obtain more uniformity in planting and cultivating, and to improve equipment operation efficiency.

Land Treatment Measures	Function
Irrigation Land Levelling (water levelling irrigated riceland)	Reshaping land surfaces to uniform, level grade in order to improve irrigation efficiency and increase yields.
Wildlife Wetland Habitat Management	Managing, retaining, or creating wildlife habitat to provide food and cover for wildlife and to maintain soil cover.
Wildlife Upland Habitat Management	Managing, retaining, or creating wildlife upland habitat to provide food and cover for wildlife and to maintain soil cover.

Land used within its capabilities and on which the proper conservation practices have been applied to compensate for its limitations is considered to be adequately treated. Providing necessary drainage and maintaining proper ground cover are the major land treatment problems in the watershed. Proper drainage allows healthy plant growth and good cover minimizes sheet erosion. On-farm mains and laterals, combined with adequate outlets, will provide drainage and flood protection needed for profitable and efficient production of crops.

Of the 124,000 acres to be treated adequately during the installation period, 114,300 acres are cropland, 4,900 acres are pastureland, and 4,800 acres are other land. In addition, conservation plans will have been prepared and some land treatment (not enough for the land to be adequately treated) begun on 16,200 acres of cropland and 3,300 acres of pastureland.

Conservation measures to be planned and applied on cropland include conservation cropping systems, crop residue management, land smoothing, and structures for water control. Control of headcutting and channel bank erosion where concentrations of water enter deeper channels will be accomplished through the installation of structures for water control (pipe drops); see figure 3. All such structures that control erosion on ditches entering nonproject channels will be a land treatment measure. Structures that control erosion on ditches with less than 20 acres drainage area entering project channels will also be land treatment measures. Other structures that control erosion of areas entering project channels will be project structural measures. The installation of these conservation measures on cropland will enhance the use of high-residue-producing and soil-conditioning crops, provide controlled disposal of excess surface water and reduce erosion.

Conservation measures to be planned and applied on pasture include pasture and hayland management, pasture and hayland planting, and drainage mains and laterals. These measures will contribute materially to the establishment of a sound livestock grazing program. They will

facilitate a more uniform distribution of grazing and permit management which will provide more effective ground cover for runoff and erosion control.

Approximately 4,800 acres of multiple-use wildlife habitat on cropland and other land will be created, maintained, or improved during the installation of land treatment measures by establishing plants that provide wildlife food and cover. Diking and installing structures for water control on wetlands will be used to improve wildlife habitat. Technical assistance through the soil and water conservation district program will be made available for land users to encourage and assist them in proper development of other conservation measures that will improve wildlife habitat and harvest.

Although an accelerated forestry program is not proposed for this watershed, technical assistance to forest landowners is available from the Louisiana Forestry Commission under the going Cooperative Forest Management Program. Landowners will be encouraged to apply multiple-use management to their forest lands.

The amount and estimated costs of conservation treatment measures to be applied are shown in table 1. These measures will be installed during the 10-year installation period. Installation and maintenance of such measures will continue after the installation period.

Accelerating the present rate of technical assistance during the 10-year installation period is expected to accomplish the following results:

1. Land users who are now or will become soil and water conservation district cooperators will develop 297 soil and water conservation plans.

2. Land users who will become soil and water conservation district cooperators will sign 281 new soil and water conservation agreements.

3. Land users will revise 205 conservation plans now in use.

4. Soil surveys will be made on the remaining 34,400 acres needing surveys.

5. Complete conservation treatment to adequately treat 124,000 acres of land will be installed and some conservation treatment begun on 19,500 acres of cropland and pastureland.

Structural Measures

Measures in this plan are comprehensive in nature, with full consideration given to the multiple-use concept of resource planning. The primary benefits that will accrue as a result of project installation will be from flood reduction and drainage. Minimizing damages to fish and wildlife while achieving these objectives is an important concern.

Structural measures consist of channel work which includes (1) excavation, (2) clearing, (3) structures for water control (weirs), (4) structures for water control (pipe drops), and (5) grade stabilization structures. The basis for selection of designs is discussed in detail in the INVESTIGATIONS AND ANALYSES section.

Approximately 250 miles of project channels are necessary to achieve project objectives in reducing flood damages and inadequate drainage. These channels will be referred to herein as "project channels" within the benefit area as shown on the Project Map, Figure 8. Twenty-six miles will be cleared, and 203 miles will be enlarged. Ground cover and root armor will be left intact in channels which are cleared only. Twenty-one miles are adequate and require no work, but will need to be maintained.

The published soil survey of Acadia Parish was used to locate areas of possible channel stability problems. The stability of present channels was also observed.

Geologic and Engineering Investigations and Analyses indicated the soils were either clays (CH) or silty clays (CL) except in one area. This area and other pertinent information on channel stability is discussed under Geologic Investigations.

Classification of the type of channel and flow characteristics of the project channels is as follows:

Type of Channel	Length Project Channels	Length Requiring Work
	miles	miles
Manmade or previously modified	248	227
Natural or previously unmodified	2	2
Nonexisting or no-defined channel	0	0
Total	250	229

Flow Characteristics

Ephemeral	237	218
Intermittent	7	5
Ponded Water	6	6
Total	250	229

The length and area to be occupied by project channels rights-of-way are shown on the tabulations on the following pages.

These flow conditions will remain the same after the project is installed except for changes due to the increase in ponded water created by the installation of structures for water control (weirs). The ponded water will be created in 11 miles of previously ephemeral flow and 1 mile of intermittent flow. The types of channel and flow are defined in the coding system on the page following table 3.

Seven structures for water control (weirs), figure 2, will be installed at strategic points in channels to minimize damages to fish and wildlife habitat, reduce downstream sediment following construction, reduce growth of vegetation on the channel bottom during dry season, help preserve existing water supplies necessary to maintain agricultural production, and maintain aesthetics of the landscape. These structures will be installed prior to any work being performed upstream from them and will create approximately 12 miles (33 surface acres) of additional permanent water. These structures are considered appurtenant measures to channel work.

Spoil from the channels will be stacked and smoothed in the forest areas and stacked or spread, as appropriate, in open areas. Short recesses for sediment interception will be installed where needed at the junctions of principal laterals with the main channels.

As the channel work is being performed, berms will be maintained and spoil will be placed in a manner to allow maintenance equipment access to the channel. Channel crossings will be constructed where necessary for continuity of access. Some crossings will be provided by special construction of structures for water control (pipe drops). Figure 1 shows a typical profile and cross section of a channel.

Flood prevention for the town of Church Point is a project purpose. About 3 miles of Channel M-1 with intermittent flow in this vicinity are designed to provide a 100-year level of protection from flooding (significant damages to residences and businesses will not be caused by floodwater from the 100-year storm). The other 2 miles of intermittent channels that require work are portions of Gum Point and Deep Gully.

LENGTH AND AREA OCCUPIED BY PROJECT CHANNELS RIGHTS-OF-WAY

Channel Number	Excavation			Clear Only			Adequate		
	Length[a]	Right-of-Way Existing	Right-of-Way Planned	Length[a]	Right-of-Way Existing	Right-of-Way Planned	Length[a]	Right-of-Way Existing	Right-of-Way Planned
	miles	acres	acres	miles	acres	acres	miles	acres	acres
M-1	2.76	58.53	79.91	-	-	-	-	-	-
L-1A	-	-	-	1.99	7.65	11.48	-	-	-
L-1A-1	2.58	7.20	15.05	-	-	-	-	-	-
L-1A-1A	0.52	1.43	3.01	-	-	-	-	-	-
L-1B	9.11	71.10	105.25	0.28	2.58	3.00	-	-	-
L-1C	1.18	3.25	6.94	-	-	-	-	-	-
L-1D	4.02	11.06	23.39	-	-	-	1.10	3.02	8.31
L-1D-1	1.30	3.57	7.63	-	-	-	-	-	-
L-1D-3	1.98	5.44	11.57	-	-	-	-	-	-
L-1D-4	1.01	2.78	5.95	-	-	-	-	-	-
L-1E-1	1.16	3.19	6.82	-	-	-	-	-	-
L-1E-2	0.67	1.84	3.88	-	-	-	-	-	-
L-1E-3	1.13	3.11	6.65	-	-	-	-	-	-
L-1E-4	0.46	2.48	3.03	-	-	-	-	-	-
L-1E-4A	1.98	5.44	11.67	-	-	-	-	-	-
L-1E-4B	2.13	5.96	12.44	-	-	-	-	-	-
L-1E-4B-1	1.83	5.03	10.70	-	-	-	-	-	-
L-1E-5	0.50	1.39	2.90	-	-	-	-	-	-
L-1E-6	0.20	1.38	1.72	0.76	5.97	7.35			
L-1F	2.68	7.37	15.62	-	-	-	1.88	2.96	5.70
L-1F-1	1.15	3.16	6.76	-	-	-	-	-	-
L-1F-1A	0.31	0.85	1.80	-	-	-	-	-	-
L-1F-2	0.52	1.43	3.01	-	-	-	-	-	-
L-1G	2.87	7.89	16.73	-	-	-	-	-	-
L-1H	3.78	10.40	22.00	-	-	-	-	-	-
L-1H-1	0.90	2.48	5.21	-	-	-	-	-	-
L-1I-1	2.46	6.77	14.35	-	-	-	-	-	-
L-1I-2	1.22	3.36	7.16	-	-	-	-	-	-
L-1I-3	1.34	3.69	7.86	-	-	-	-	-	-
L-1I-4	1.45	3.99	8.50	-	-	-	-	-	-
L-1I-5	3.48	23.35	31.30	0.76	5.05	6.43	-	-	-
L-1I-6	5.38	19.59	56.22	-	-	-	-	-	-
L-1I-7	3.17	20.08	28.16	3.19	21.98	27.79	-	-	-
L-1I-7A	0.58	3.11	4.49	-	-	-	-	-	-
L-1I-8	2.20	8.45	16.87	-	-	-	-	-	-
L-1I-8A	0.46	2.35	3.45	-	-	-	-	-	-
L-1I-8A-1	0.95	4.56	6.94	-	-	-	-	-	-
L-1I-9	1.26	8.56	12.52	-	-	-	-	-	-
L-1I-9A	0.90	3.45	7.43	0.34	2.21	3.11	-	-	-
L-1I-9A-1	0.39	1.39	2.70	-	-	-	-	-	-
L-1I-10	0.57	2.78	4.12	0.66	3.13	5.55	1.52	6.62	12.12
L-1I-10A	0.29	1.02	2.14	-	-	-	-	-	-
L-1I-10B	0.44	1.03	2.84	-	-	-	1.02	2.48	6.83
L-1I-10B-1	0.55	2.30	3.73	-	-	-	0.38	1.61	2.53
L-1I-11	0.29	0.51	1.80	-	-	-	-	-	-
L-1I-12	-	-	-	0.66	1.19	4.37	-	-	-
L-1J	1.65	4.54	9.66	-	-	-	-	-	-
L-1J-1	0.64	1.76	3.71	-	-	-	-	-	-
L-1K	7.32	35.44	65.58	3.10	14.29	26.71	-	-	-
L-1K-1	2.01	5.53	17.75	-	-	-	-	-	-
L-1K-1A	0.84	2.31	4.87	-	-	-	-	-	-
L-1K-2	0.81	2.23	4.69	-	-	-	-	-	-
L-1K-3	0.64	1.77	3.71	-	-	-	-	-	-
L-1K-4	5.03	26.34	47.34	3.50	24.64	32.28	-	-	-
L-1K-4A	0.75	2.06	4.35	-	-	-	-	-	-
L-1K-4B	1.51	6.18	10.96	-	-	-	1.52	8.71	12.93
L-1K-4B-1	0.58	1.60	3.36	-	-	-	-	-	-
L-1K-4B-2	1.01	2.78	5.85	-	-	-	-	-	-
L-1K-4B-3	0.86	1.54	6.15	-	-	-	-	-	-
L-1K-4C	0.94	2.59	5.45	-	-	-	-	-	-
L-1K-4D	0.73	1.30	4.16	-	-	-	-	-	-
L-1K-4E	0.38	1.34	2.32	-	-	-	0.66	3.22	4.83
L-1K-5	1.30	7.19	10.33	1.80	11.47	14.65	1.42	10.32	12.04
L-1K-5A	1.76	4.84	10.30	-	-	-	-	-	-
L-1K-5B	0.94	2.58	5.45	-	-	-	-	-	-
L-1K-5B-1	0.45	1.24	2.61	-	-	-	-	-	-
L-1K-6	1.49	4.10	8.73	-	-	-	-	-	-
L-1K-7	1.65	4.54	9.66	-	-	-	-	-	-
L-1L	4.21	19.23	36.03	0.76	3.49	6.62	1.97	8.59	18.15
L-1L-1	3.55	15.24	29.73	2.08	11.53	18.73	1.60	9.62	13.89
L-1L-2	7.32	41.39	66.09	0.19	1.24	1.70	-	-	-
L-1L-2A	0.60	1.65	3.48	-	-	-	-	-	-
L-1L-2B	0.56	1.54	3.24	-	-	-	-	-	-
L-1L-2C	0.69	1.90	4.00	-	-	-	-	-	-
L-1L-2D	0.99	2.72	5.74	-	-	-	-	-	-
L-1L-2E	1.17	3.22	6.88	-	-	-	-	-	-
L-1M	0.84	2.31	4.87	-	-	-	-	-	-
L-1N	1.74	4.79	10.18	-	-	-	-	-	-
L-1O	1.39	3.82	8.15	-	-	-	-	-	-
L-1P	0.26	0.72	1.51	-	-	-	-	-	-
L-1P-1	0.20	0.55	1.16	-	-	-	-	-	-

a/ See Appendix K for Inventory of Channel Work by Reaches.

-continued-

LENGTH AND AREA OCCUPIED BY PROJECT CHANNELS RIGHTS-OF-WAY (continued)

Channel Number	Excavation			Clear Only			Adequate Right-of-Way		
	Length[a/]	Existing	Planned	Length[a/]	Existing	Planned	Length[a/]	Existing	Planned
	miles	acres		miles	acres		miles	acres	
L-1R	10.66	67.32	107.99	-	-	-	-	-	-
L-1R-1	1.96	9.41	15.41				0.28	1.00	2.38
L-1R-2	0.83	3.99	5.88	0.66	2.88	4.27	1.33	9.62	12.04
L-1R-3	2.75	11.22	21.88	-	-	-	-	-	-
L-1R-4	0.50	0.65	2.05	-	-	-	-	-	-
L-1R-5	1.24	6.14	9.07	-	-	-	-	-	-
L-1S	0.40	1.42	4.84	-	-	-	-	-	-
L-1U	0.70	1.42	3.33	-	-	-	-	-	-
L-1V	0.53	1.39	3.78	-	-	-	-	-	-
L-1W	0.67	3.78	7.17	1.68	13.29	17.11	2.27	14.01	19.51
L-1W-1	0.77	1.45	5.52	0.98	3.90	6.74	1.38	5.57	9.52
L-1W-1B	1.46	3.56	7.24	-	-	-	-	-	-
L-1W-2	0.42	1.20	3.49	2.65	18.32	25.71	-	-	-
L-1W-2A	2.33	9.22	19.94	0.19	1.15	1.72	-	-	-
L-1W-2A-1	0.29	0.82	2.07	-	-	-	-	-	-
L-1W-2B	1.01	2.29	7.11	-	-	-	-	-	-
L-1W-5	0.64	1.57	5.02	-	-	-	0.25	0.80	2.02
L-1W-5A	0.26	0.31	1.62	-	-	-	-	-	-
L-1Y	1.21	5.36	10.10	-	-	-	-	-	-
L-1Y-1	2.01	6.27	16.49	-	-	-	-	-	-
L-1Z	1.80	4.95	10.53	-	-	-	-	-	-
L-1Z-1	0.60	1.65	3.48	-	-	-	-	-	-
L-1Z-2	0.64	1.76	3.71	-	-	-	-	-	-
L-1Z-3	0.49	1.35	2.84	-	-	-	-	-	-
L-1Z-5	0.35	0.96	2.03	-	-	-	-	-	-
L-1Z-6	0.35	0.96	2.03	-	-	-	-	-	-
L-1AA	-	-	-	-	-	-	2.45	19.57	27.88
L-1AA-1	0.50	1.38	2.90	-	-	-	-	-	-
L-1AA-2	0.41	1.13	2.38	-	-	-	-	-	-
L-1AA-3	0.52	1.43	3.01	-	-	-	-	-	-
L-1AA-4	C.18	0.50	1.04	-	-	-	-	-	-
L-1AA-5	0.75	2.06	4.34	-	-	-	-	-	-
L-1AA-5A	0.35	0.96	2.03	-	-	-	-	-	-
L-1AA-6	0.50	1.38	2.90	-	-	-	-	-	-
L-1AA-7	0.90	2.47	5.21	-	-	-	-	-	-
L-1AA-8	0.73	2.01	4.22	-	-	-	-	-	-
L-1BB-1	4.61	12.68	26.87	-	-	-	-	-	-
L-1BB-1A	0.60	1.65	3.48	-	-	-	-	-	-
L-1BB-1A-1	0.31	0.85	1.80	-	-	-	-	-	-
L-1CC	0.56	1.54	3.24	-	-	-	-	-	-
L-1DD	1.74	4.89	10.18	-	-	-	-	-	-
L-1DD-1	0.82	2.26	4.75	-	-	-	-	-	-
L-1EE	0.52	1.43	3.01	-	-	-	-	-	-
L-1FF	1.18	3.24	6.94	-	-	-	-	-	-
L-1FF-1	0.48	1.32	2.78	-	-	-	-	-	-
L-1FF-2	0.22	0.61	1.27	-	-	-	-	-	-
L-1FF-3	0.16	0.44	0.93	-	-	-	-	-	-
L-1GG	0.47	1.29	2.72	-	-	-	-	-	-
L-1HH	3.69	10.25	20.96	-	-	-	-	-	-
L-1HH-1	0.77	2.13	4.49	-	-	-	-	-	-
L-1HH-2	0.35	0.96	2.03	-	-	-	-	-	-
L-1II	1.47	4.04	8.62	-	-	-	-	-	-
L-1II-1	0.64	1.76	3.71	-	-	-	-	-	-
L-1JJ	1.65	4.54	9.66	-	-	-	-	-	-
L-1JJ-1	0.47	1.29	2.72	-	-	-	-	-	-
L-1KK	0.75	2.06	4.35	-	-	-	-	-	-
L-1KK-1	0.26	0.72	1.51	-	-	-	-	-	-
L-1KK-2	0.29	0.80	1.68	-	-	-	-	-	-
L-1LL	0.39	1.07	2.26	-	-	-	-	-	-
L-1MM	0.37	1.02	2.14	-	-	-	-	-	-
L-1NN	0.39	0.92	2.76	-	-	-	-	-	-
L-1OO	2.68	7.47	15.63	-	-	-	-	-	-
L-1OO-1	0.48	1.32	2.78	-	-	-	-	-	-
L-1OO-2	0.35	0.96	2.03	-	-	-	-	-	-
L-1PP	2.23	6.13	13.02	-	-	-	-	-	-
L-1QQ	0.88	2.42	5.10	-	-	-	-	-	-
L-1RR	0.37	1.02	2.14	-	-	-	-	-	-
L-1TT	1.99	5.47	11.63	-	-	-	-	-	-
Total	202.77	827.77	1,540.11	26.23	155.96	225.32	21.03	104.70	162.37

a/ See Appendix K for Inventory of Channel Work by Reaches.

Grade stabilization structures shown as figure 4 are considered integral parts of the channel work. Preliminary studies indicate 28 grade stabilization structures are needed. These structures will prevent channel erosion and will protect downstream turbidities and maintenance. The exact locations and sizes of these structures will be determined during the operations stage when additional survey data and foundation investigations are obtained. The structures are considered appurtenant measures to channel work.

Figure 3 shows a typical structure for water control (pipe drops). These structures will be installed to prevent erosion and thus protect the channel from excessive sedimentation, reduce maintenance costs, and insure proper functioning of the channels. These structures are similar to grade stabilization structures except they are on a smaller scale, less complex, and are located on the smaller laterals entering project channels. These structures are considered appurtenant measures to channel work.

Project channels will be dug from one side, with consideration given to providing the most effective shade for channel water during the summer months. Channel excavation procedures are illustrated by figures 5 and 6.

Construction on channels tributary to Bayou Plaquemine Brule and Bayou Wikoff will be terminated at a distance ranging from 200 feet to 1,000 feet before entering these bayous in order to lessen the adverse effects to fisheries. The intervening undisturbed areas are adequate incised channels which will filter out some suspended sediment before it enters the bayous. The major beneficial effect of this filtering will be to help reduce turbidity in the bayous. For further discussion of this subject, see item 4, page 80.

Approximately 1,928 acres of rights-of-way will be disturbed because of channel work. Approximately 1,088 acres are occupied by existing channels, berms, and spoil. Therefore, approximately 840 acres of additional rights-of-way will be needed to install the project measures of this watershed. This 840-acre increase is comprised of 654 acres of open land, 96 acres of wooded channel banks, and 90 acres of forest. Several alternatives for establishing vegetative cover on the disturbed areas were evaluated by the Louisiana Wild Life and Fisheries Commission, U.S. Fish and Wildlife Service, and Soil Conservation Service. Due consideration was given to providing the most expedient method of reestablishing vegetation to prevent erosion and to provide food and cover for wildlife. The most practical approach would be to establish a ground cover and plant hardwood seedlings where applicable.

Vegetation will be established on rights-of-way and disturbed areas along project channels after heavy or plant-destroying equipment has ceased traveling on the berm. Depending on the season of the year,

A Structure for Water Control (Weir)
Similar to the Ones Planned on Larger Channels

A Structure for Water Control (Pipe Drop)
Similar to the Ones Planned on Small Side Drains

the crops being grown, and desires of the farmer, spreading of the spoil may or may not be accomplished soon after construction. If the spoil will not be spread within 90 days after construction, it will be shaped and seeded. Spoil in forest will be stacked, shaped, and seeded. Depending upon soil type and season of the year, species such as the following can be used - Common bermudagrass, Pensacola bahiagrass, Common lespedeza, Sericea lespedeza, browntop millet, ryegrass, and fescue.

Alteration, modification, or reconstruction of some existing facilities such as bridges, culverts, and pipelines will be necessary to insure proper functioning of planned structural measures. The work on the bridges involves the enlargement of the channel cross section by excavating under the bridge, reinforcing one or more bents of pilings, or lengthening a bridge in order to widen the channel. Work on the culverts involves replacing existing culverts with larger ones, lengthening existing culverts, or lowering the grade of existing culverts. Work on the pipelines involves the lowering or casing of existing pipelines. No bridges, culverts, or pipelines will be relocated.

This alteration, modification, or reconstruction includes, but is not limited to 6 bridges and 11 culverts on State and Federal highways, 67 bridges and 135 culverts on parish and private roads, pipelines at 57 locations, 32 irrigation flumes, 11 watergate and utility lines, and fences at 137 locations. The work will be done concurrently with channel construction. The specific location of existing facilities to be altered are shown on the design profiles and cross sections in the working files. Replacement of any State and Federal highway bridges or culverts will be coordinated with the Louisiana Highway Department early in the design phase prior to construction. Designs will be in accordance with current standards for traffic and type of highway. Structural measure installations are expected to be completed in a 6-year period.

There are no relocations of residences or businesses required.

The disposal of all clearing wastes and construction debris will be accomplished by burying, burning, or removal from the construction site. Burying will limit smoke pollution from burning. Burning operations, if necessary, shall be conducted in accordance with the Louisiana Air Control Commission regulations and other applicable laws governing such operations. Noise levels will be monitored and standards of the Occupational Safety and Health Act will be followed.

All construction equipment will be properly equipped with noise resinators. Because of the type of work to be performed, this equipment will be widely dispersed throughout the watershed, rather than concentrated at any one location. Equipment will not be permitted to work when conditions are such that satisfactory control of soil erosion, water, air, and noise pollution cannot be accomplished.

IMPROVEMENT

The data presented below summarizes the preproject and post-project conditions for fish habitat that is modified by construction.

PREPROJECT

Flow Condition	Miles	Acres	Standing Crop	Total Pounds
Intermittent	5	20	25 lbs/ac	500
Ponded	6	19	70 lbs/ac	1,300

POSTPROJECT

Flow Conditions	Miles	Acres	Standing Crop	Total Pounds
Intermittent	4	21	25 lbs/ac	525
Ponded (existing)	6	19	70 lbs/ac	1,330
Ponded (weirs)	12 a/	33	15 lbs/ac	495

a/ Two miles of existing ponded water will be improved aquatic habitat because of installation of a weir in shallow ponded water which will increase the depth of the existing water in Channel L-1B from less than 1-foot average depth to an average depth of 2 feet.

Ninety acres of forest land habitat will be cleared for channel rights-of-way. This acreage includes the clearing for the berm, spoil, and channel enlargement. The existing acreage in channels was not included in this total because the channel proper contains only small diameter, woody vegetation or no woody vegetation.

The 90-acre loss of forest land habitat will be mitigated by planting hardwood seedlings on the 34 acres of spoil in forest land. It will be vegetated with grasses which will provide forage for forest wildlife species. The 41 acres converted to berms in the forest land will have to be kept relatively free of trees for maintenance purposes. The 34 acres of spoil that will be planted in hardwood seedlings represents the entire amount available for planting in the forest land. Seedlings of the following species will be used depending on the soil types and availability: water oak, sweet pecan, and willow oak. The seedlings will be planted the first dormant season after the grass sod is established. If the grass is established during the early part of the dormant season, it would be possible to plant the seedlings the latter part of the same season. A small area will be "scraped" where 1- or 2-year old seedlings will be planted.

IMPROVEMENT

The following specific measures will be used to eliminate or minimize adverse effects to the plant, animal, and aquatic resources.

1. Excavation in forest land will be limited to the side of the channel with the poorest quality habitat with consideration given to providing the most shade possible to the ponded water channels.

2. Excavation in forest land habitat will be minimized.

3. Selected trees will be left on the berms and channel banks for aesthetic and wildlife purposes. (See figures 5 and 6.)

4. Investigations conducted during the development of the Work Plan indicate that channel excavation will not be required on the lower ends of the surveyed channels tributary to Bayou Plaquemine Brule and Bayou Wikoff before their confluence with the main outlet. During the design stage, many of the 47 unsurveyed channels that indicate channel work on the project map for their entire length will be found to be adequate near the main bayous and require no work.

5. Disturbed areas caused by construction will be revegetated with a ground cover and planted with seedlings beneficial to wildlife species.

6. Structures for water control (weirs) will be installed prior to any upstream channel work.

Land Use Changes

Land use changes in the watershed from "without-project" to "with-project" conditions are expected to be as follows:

Land Use	Present		Future Without		Future With	
	Acres	Percent	Acres	Percent	Acres	Percent
Cropland	176,000	75	178,400	76	177,959	76
Pastureland	11,100	5	8,800	4	8,586	4
Forest Land	25,100	11	23,500	10	23,410	10
Other[a]	22,200	9	23,700	10	24,445	10
Total	234,400	100	234,400	100	234,400	100

a/ Includes roads, channels, bayous, lakes, communities, farmsteads, rights-of-way, etc.

IMPROVEMENT

The preceding tabulation reflects permanent land use changes from one category to another. Approximately 1,928 acres of land will be disturbed during the installation of channel work. Of the total acres that will be disturbed, 1,088 acres are presently occupied by channel rights-of-way. Under "Future Without Project Conditions" there will be 738 acres in open land, 119 acres in forest land, 231 acres in wooded channel banks being taken up by channel rights-of-way (channels, berms, and spoil). "Future With Project Conditions" will require that 1,392 acres in open land, 209 acres in forest land, and 327 acres in wooded channel banks be taken up by channel rights-of-way. Project installation will cause an additional 654 acres of open land, 90 acres of forest land, and 96 acres of wooded channel banks to be occupied by channel rights-of-way. These changes indicate there will be an overall increase in the "other land" category because of additional rights-of-way requirements in open land and forest land. However, since wooded channel banks and existing channels, berms, and spoil are already in the "other land" category, increase will not occur because this is a change within the same land use.

A summary of the changes reveals that there are at the present time 1,088 acres of land in the watershed taken up by the channel rights-of-way, which will increase to 1,928 acres with the project. The following data summarizes the preceding discussion by wildlife habitat types.

Future Without Project		Future With Project	
Land Use	Acreage in Channel R.O.W.	Land Use	Acreage in Channel R.O.W.
Open Land	738	Open Land	1,392
Forest Land	119	Forest Land	209
Wooded Channel Banks	231	Wooded Channel Banks	327
Total	1,088	Total	1,928

There are no properties listed in the National Register of Historic Places that will be affected by the installation of structural measures.

Should any archaeological or historical sites be discovered during the installation of structural measures, construction will be stopped. The Secretary of Interior (National Park Service), the Curator of Anthropology, and the Historical Preservation Officer will be notified, and will be given an opportunity to evaluate and make recommendations for salvage or mitigation before construction continues. Also, the Advisory Council on Historic Preservation will be afforded an opportunity to comment in accordance with the "Procedures for the Protection of Historic and Cultural Properties."

IMPROVEMENT

The State Historic Preservation Officer's letter dated January 9, 1975 states that his department does not know of any sites on the National Register of Historic Places or being actively nominated to the National Register which would be affected by this proposed project.

EXPLANATION OF INSTALLATION COSTS

The total installation cost of the project is estimated to be $8,406,800, of which $3,492,880 will be borne by Public Law 566 funds and $4,913,920 by other funds (see table 1). Included in the total project cost is $3,349,300 for land treatment measures and $5,057,500 for structural measures.

Land Treatment Measures

The cost of installing these measures is estimated to be $3,349,300. Of the total, $2,916,000 will be borne by individual landowners and operators. This includes $270,600 for wildlife habitat management. The remaining $432,700 represents the cost of technical assistance during the 10-year installation period. Of this amount, $238,100 will be provided by Public Law 566 for acceleration of the going program, and $194,600 will be furnished by funds provided through the Soil and Water Conservation District Program.

The installation of these practices will ensure the timely realization of project benefits and will provide for proper treatment of the land for protection and improvement. This plan provides for installation of these measures within a 10-year project installation period.

Structural Measures

The total cost of installation for the structural measures (channel work) is $5,057,500, of which $3,098,800 is for construction, $216,900 is for engineering services, $1,090,400 is for land rights and $651,400 is for project administration. The cost of this work, which includes channel work (excavation and clearing), appurtenant grade stabilization structures, structures for water control, and vegetative plantings is shown in table 1. The allocation of these costs to their respective purposes are shown in table 2A. These costs include the structural measures construction cost, engineering services cost, and "other costs."

The cost of excavation and clearing is $3,421,000, of which $2,179,200 is for construction, $152,600 for engineering services, and $1,089,200 for land rights.

Total land rights costs include $334,200 for the value of land, surveys, and legal fees; $50,900 for modification or replacement of 6 State and Federal bridges; $268,900 for 62 parish and private bridges; $37,800 for 11 State and Federal culverts; and $176,200 for 135 parish and private culverts; alteration, modification, or reconstruction of existing miscellaneous facilities such as pipelines, irrigation flumes, and utilities will cost $222,400.

Except as noted under grade stabilization structures, no additional land rights are considered necessary for the installation of appurtenant structures. They will be installed in the channel rights-of-way.

The cost of installing the structures for water control (pipe drops) is $447,500, of which $418,200 is construction cost, and $29,300 is engineering services cost.

The cost of installing the structures for water control (weirs) is $146,400 for construction, and $10,200 for engineering services for a total of $156,600.

The cost of establising vegetation on the disturbed areas is $224,500, with $209,800 for construction cost, and $14,700 for engineering services.

The cost of installing the grade stabilization structures (drop inlets) is $156,500 of which $145,200 is for construction, $10,100 is for engineering services, and $1,200 is for land rights.

Eleven acres of additional rights-of-way will be needed for the installation of grade stabilization structures.

The cost of all engineering services ($216,900) includes the direct costs of work to be done by engineers and technicians in relation to structural measures. The work consists of surveys, investigations, designs, and preparation of plans and specifications, including vegetative requirements. The cost of these services will be paid by Public Law 566 funds.

No relocation payments are considered to be required at this time. If they are subsequently required, they will be funded in accordance with paragraph 2 of the Watershed Work Plan Agreement.

The Service and the Sponsoring Local Organization will be responsible for the total cost of items of project administration that each incurs. The costs (estimated to be $651,400) are the administrative costs associated with the installation of structural measures. The Sponsors will bear costs for administration of contracts ($31,010) and for such inspections ($3,110) they believe necessary to ensure themselves the work is being done according to their interest. The Service will bear the costs of inspections ($310,100) that are necessary to protect the interest of the Federal Government and will prepare certificates of completion. Also, the Service will bear the cost of Government representatives and other project administration services it incurs ($307,780). A project agreement will be entered into between the Service and the affected Sponsors before any work is begun.

The costs of measures were estimated using current prices of work of comparable size and complexity and adjusted to local conditions. This was further modified by adding a contingency of about 20 percent to provide a reasonable margin to cover unexpected costs.

All structural measures except Channel M-1 are multiple-purpose, serving both flood prevention and drainage. The total cost of structural measures, excluding project administration, is $4,406,100, of which $2,423,700 is allocated to flood prevention and $1,982,400 is allocated to drainage. All costs for mulitple-purpose channels with appurtenances were allocated equally to flood prevention and drainage ($1,982,000) each. The work on Channel M-1 and its appurtenances are single-purpose for flood prevention. Therefore, 100 percent of its cost ($441,300) is allocated to flood prevention. This results in 55 percent of the cost being allocated to flood prevention and 45 percent to drainage, as shown on table 2A.

A Schedule of Obligations for the 10-year installation period, including both land treatment and structural measures, is exhibited on the following page.

Bayou Plaquemine Brule Watershed, Louisiana

SCHEDULE OF OBLIGATIONS
(Dollars)1/

Year	Measures	PL-566 Funds	Other Funds	Total Funds
1st	Construction	411,450	137,150	548,600
	Engineering Services	83,000	0	83,000
	Land Rights	0	396,500	396,500
	Project Administration	56,800	3,200	60,000
	Land Treatment	0	293,700	293,700
	Soil Surveys	6,600	200	6,800
	Technical Assistance	22,100	19,400	41,500
2nd	Construction	574,250	62,750	637,000
	Engineering Services	31,500	0	31,500
	Land Rights	0	145,000	145,000
	Project Administration	127,650	6,950	134,600
	Land Treatment	0	293,700	293,700
	Soil Surveys	6,600	200	6,800
	Technical Assistance	22,300	19,400	41,700
3rd	Construction	337,275	112,425	449,700
	Engineering Services	30,800	0	30,800
	Land Rights	0	131,500	131,500
	Project Administration	102,050	5,750	107,800
	Land Treatment	0	293,700	293,700
	Soil Surveys	6,600	200	6,800
	Technical Assistance	22,500	19,400	41,900
4th	Construction	329,775	109,925	439,700
	Engineering Services	43,100	0	43,100
	Land Rights	0	259,500	259,500
	Project Administration	91,400	4,900	96,300
	Land Treatment	0	293,700	293,700
	Soil Survyes	0	0	0
	Technical Assistance	22,500	19,400	41,900
5th	Construction	462,225	154,075	616,300
	Engineering Services	28,500	0	28,500
	Land Rights	0	157,900	157,900
	Project Administration	104,500	5,500	110,000
	Land Treatment	0	290,500	290,500
	Soil Surveys	0	0	0
	Technical Assistance	21,100	19,400	40,500
6th	Construction	305,625	101,875	407,500
	Engineering Services	0	0	0
	Land Rights	0	0	0
	Project Administration	101,040	5,660	106,700
	Land Treatment	0	291,200	291,200
	Soil Surveys	0	0	0
	Technical Assistance	21,200	19,400	40,600
7th	Construction	0	0	0
	Engineering Services	0	0	0
	Land Rights	0	0	0
	Project Administration	33,840	2,160	36,000
	Land Treatment	0	294,600	294,600
	Soil Surveys	0	0	0
	Technical Assistance	22,700	19,400	42,100
8th	Project Administration	0	0	0
	Land Treatment	0	292,600	292,600
	Soil Surveys	0	0	0
	Technical Assistance	22,300	19,400	41,700
9th	Project Administration	0	0	0
	Land Treatment	0	291,900	291,900
	Soil Surveys	0	0	0
	Technical Assistance	22,300	19,400	41,700
10th	Project Administration	0	0	0
	Land Treatment	0	281,000	281,000
	Soil Surveys	0	0	0
	Technical Assistance	19,300	19,400	38,700
	Total	3,492,880	4,913,920	8,406,800

EFFECTS OF WORKS OF IMPROVEMENT

Flood Prevention and Drainage

The installation of the combined program of land treatment and structural measures will directly benefit about 111,600 acres of cropland and pastureland. The remaining 74,900 acres of cropland and pastureland will not be affected by project channel work. Although benefits were not calculated on these acres, they will benefit from the accelerated installation of land treatment measures and by rotational systems allowable because of project effects in the benefited areas.

The area directly benefited consists of 34,100 acres of rice, 51,600 acres of soybeans, 400 acres of cotton, 4,500 acres of corn, 5,800 acres of sweet potatoes, 10,600 acres of rice-rotational pasture, and 4,600 acres of permanent pasture. The acres shown in the benefited area differ from those in the problem areas because of rights-of-way requirements and shifts in land use. Average annual yields per acre will increase 5 percent for rice, 17 percent for soybeans, 29 percent for cotton, 33 percent for corn, 8 percent for sweet potatoes, and 19 percent for pasture.

Land in forest should remain in forest since only minor areas of forest are to be traversed or affected by project channels and these channels were not designed to protect forested areas. If forested areas were cleared for agricultural production, the wetness problem generally would be more severe than that which is presently on the cropland and pastureland.

The project will accelerate the establishment of conservation practices and increase the effectiveness of those already on the land. These practices will protect the agricultural resources of the area and improve the environment. Landowners and operators will construct and maintain adequate on-farm and group drainage facilities in order that project benefits will accrue.

An estimated 480 farmers will directly benefit from the installation of project measures and land treatment. An additional 40 farmers will benefit from accelerated land treatment only. These measures will provide benefits for 2,100 farm family members and farm employees. Other persons dependent on farm trade will also benefit. Benefits will accrue from the financial and technical assistance made available for the installation of the project. This will bring outside monetary resources into the community and will provide an opportunity to use goods, services, and labor from the local area. The use of unemployed or underemployed local labor will be needed during project installation and throughout project life for normal operation and maintenance.

Future land use that will be affected by project construction is indicated in the tabulation on the following page.

Land Use	FUTURE WITHOUT PROJECT		FUTURE WITH PROJECT	
	acres	percent	acres	percent
Cropland	178,400	76	177,959	76
Grassland	8,800	4	8,586	4
Forest Land	23,500	10	23,410	10
Other a/	23,700	10	24,445	10
TOTAL	234,400	100	234,400	100

a/ Includes roads, channels, bayous, lakes, communities, farmsteads, rights-of-way, etc.

The preceding tabulation reflects permanent land use changes from one category to another. About 1,928 acres of land will be disturbed during the installation of channel work, including 1,088 acres presently occupied by channel rights-of-way. Under FUTURE WITHOUT PROJECT conditions, there would be 738 acres in open land, 119 acres in forest land, and 231 acres in wooded channel banks being taken up by channel rights-of-way (channels, berms, and spoil). FUTURE WITH PROJECT conditions will require that 1,392 acres in open land, 209 acres in forest land, and 327 acres in wooded channel banks be taken up by channel rights-of-way. Project installation will cause an additional 654 acres of open land, 90 acres of forest land, and 96 acres of wooded channel banks to be occupied by channel rights-of-way. These changes indicate an overall increase in the "other land" category because of additional rights-of-way requirements in open land and forest land. However, since wooded channel banks are already in the "other land" category, there will be no changes shown because of this increase. Spoil will be spread in open land unless the landowners request otherwise.

Floodwater and drainage effects other than for Channel M-1 are discussed together because the problems are inseparable. Channels which remove floodwater also remove drainage water.

The flood prevention and drainage channels will reduce the high risks involved in farming and make it a more profitable business enterprise. Farmers will be able to improve the quality and yields of their crops by (1) improving soil conditions, (2) planting earlier, (3) effectively controlling weeds and grasses, and (4) harvesting at favorable times.

Improved drainage will allow proper timing of cultural practices. Both planting and harvesting can be done efficiently at opportune dates. Large equipment can be used on the more level, better-drained fields. Timely planting will increase plant populations and extend

the growing period, thereby allowing efficient use of equipment and other factors of production. Improved drainage and flood protection will reduce the frequency of replantings and cultivations, and will allow effective application of land treatment measures. This will promote crop residue management, reduce fall plowing, and permit better rotations of crops in the problem areas. In turn, these practices will conserve soil fertility, reduce average sheet erosion by 8 percent, improve wildlife habitat, and help control weed growth.

Project measures will provide protection to agricultural land in the benefit area from a rainstorm which is expected to occur, on the average, once every 3 years. Runoff rates from the 3-year storm will exceed channel capacities, but the flooding duration will not exceed 24 hours. Flooding for this duration will not cause significant damages to crops and pastures. Larger storms will cause significant damages, but the damages will be less than they would be with present conditions.

Pasture grasses will grow faster and provide better, more desirable forage. Unpalatable, water tolerant weeds would not thrive. As a result, stocking rates for livestock would increase and the pastureland would be used nearer to its potential.

Improved farming efficiency resulting from project installation will reduce the annual cost of production. Also, the reduced flooding, improved soil conditions, and better, more timely management practices will improve the quality of products marketed.

Agricultural fertilizer uses will increase because of the project. Estimates of fertilizer use in the future show an increase of about 7 percent or 760 tons annually. This amount will be less if current research proves successful. This research deals with the time release of nutrients such as inorganic nitrogen which do not remain in the soil for long periods of time. Under continuous cropping, soil fertility would decline without further use of fertilizer. The use of fertilizers now accounts for approximately one-third the production of our total food supply.[1/]

The estimated reduction in agricultural flood damages brought about by the 3-year level of protection is 71 percent. This primarily includes the obtaining of yields that are possible with adequate outlets and effective on-farm drainage systems.

1/ U.S. Department of Agriculture, Soil Conservation Service, "Water Pollution from Agriculture," Missouri's All Employees Training Conference - Framework for the Future (Unpublished compilation of speeches and training sessions made at the training conference, 1972), pp. 42-51.

EFFECTS

Urban flood damages in Church Point will be minimized by enlarging about 3 miles of Bayou Plaquemine Brule. The channel work will prevent significant damages of homes and commercial builders from the runoff of a 100-year storm. (See figure 7.) Frequency of damage to streets, bridges, yards, and other improvements, as well as nuisance and health problems caused by flooding will be reduced.

Peak stages will be increased in channels downstream from modified channel reaches. The stage increases at selected points are shown in the following tabulation.

Stream and Station	Increase Stage - Feet 3-yr.	10-yr.	100-yr.
Bayou Plaquemine Brule (M-1)			
2240+00	0.1	0.1	0.1
1950+00	0.2	0.2	0.3
1665+69	0.2	0.2	0.2
1280+00	0.2	0.2	0.3
839+60	0.1	0.2	0.2
624+16a/	0.1	0.1	0.2
435+00	0.2	0.1	0.1
0+00	0.1	.05	.05
Bayou Wikoff (L-1I)			
560+00	.05	0.1	.05
Bayou Blanc			
287+00a/	0.1	0	0
Mermentau River near Mermentaub/	0	0	0

a/ Near Crowley

b/ Combined effect of all existing and proposed Public Law 566 watershed projects upstream from this point.

Under present conditions, a storm of 1 percent chance occurrence (100-year frequency) will produce a peak stage on Bayou Plaquemine Brule in Church Point at Louisiana Highway 95 of approximately 45.8 feet mean sea level (m.s.l.). With project measures installed, the 100-year peak will be about 43.6 feet m.s.1 or 2.2 feet lower.

The project will reduce damages in Church Point significantly to 40 residences, 11 commercial properties, and an industrial complex. Damages to yards, roads, and bridges will also be reduced.

EFFECTS

While urban damages from flooding cannot be completely eliminated for storms larger than a 10 percent chance occurrence, reductions in these damages from the storm that occurs once in 25 years amounts to 95 percent, and the reduction in damages from a 100-year storm would amount to 95 percent. The remaining urban damages under project conditions will be to one house, a camp building, and numerous yards. The one house will be flooded 3 inches over the floor by the 100-year storm. This house is presently unoccupied and is valued at an estimated $1,500.

Commercial and industrial damages will be reduced an estimated 80 percent. Remaining commercial and industrial damages will consist of cleanup costs and losses in value of equipment and supplies.

Road and bridge damages in the watershed will be reduced an estimated 70 percent. Reduction in frequency of road flooding will reduce the chance of loss of human life.

Following project installation, the highway bridges over Bayou Plaquemine Brule at Church Point will be protected to an extent that traffic may continue uninterrupted during the passage of a 100-year storm. This will eliminate the inconvenience to schools and the hazards of people being separated from fire and police protection and medical aid.

The capacity of the natural drainageway of Bayou Plaquemine Brule (M-1) downstream from Church Point must be maintained for a distance of approximately 8 miles. This point is located approximately 1 mile downstream from Louisiana Highway 365. This will assure that the section near Church Point that will be enlarged will function as designed. The Sponsoring Local Organization will prevent to the extent possible, development in this area. They will monitor the designs of future construction and landfills in the drainageway to assure that adequate flow capacity is maintained.

The extent of urban flood protection for Church Point is from approximately 2 miles above to 1 mile below the town limits (figure 7). In order to prevent the local citizenry from assuming a false sense of security from the planned measure, the Sponsors will publicize at least annually the nature and extent of flood hazards remaining in those areas subject to flooding by the 100-year storm.

This project does not provide urban flood protection to areas in the town of Crowley subject to the 100-year storm. The channels shown on the project map in the vicinity of Crowley are designed to provide an adequate outlet for the adjacent agricultural runoff and existing urban drainage systems. The Type 15, Flood Insurance Study, Crowley, Louisiana, prepared for Federal Insurance Administration,

Department of Housing and Urban Development by the Soil Conservation Service, U.S. Department of Agriculture, contains maps showing the 100-year flood areas in Crowley.

Secondary benefits, including increased business activity and improved economic conditions in the immediate vicinity of Church Point will result from the project. Economic activities will be stimulated by an increased sense of security and the opportunity to plan future developments without consideration of frequent flooding.

The flood hazard of other urban communities in the watershed will not change with installation of project measures. Monetary values were not calculated for reduction of nuisance-type damages and increase in quality of life as a result of project channels.

Project channels will be dug from one side, with consideration given to providing the most effective shade for channel water during the summer months. Channel excavation procedures are illustrated by figures 5 and 6.

Aesthetic resources will be affected in the 19 miles of channel to be worked through forest land and 34 miles through open land where woody vegetation grows along the banks. Trees inside the channel rights-of-way may be aesthetically pleasing because of unique characteristics of size, form, color, leaf texture, bark, flowers or fruits. Such trees will be preserved wherever they will not seriously affect construction or operation and maintenance.

There are no properties listed in the National Register of Historical places that will be affected by installation of structural measures. This project will have no effect on any known archaeological or historical sites.

There are no known geodetic control survey monuments that are located within the area to be disturbed by the installation of structural measures.

Erosion and Sediment

Erosion and the resulting sedimentation and turbidity will decrease with the installation of the planned project measures. Sheet erosion over the entire watershed will be reduced from 4.9 tons per acre per year to 4.4 tons per acre per year. This is a reduction of 8 percent.

During the 10-year project installation period, sediment being delivered to Bayou des Cannes will be reduced approximately 149,600 tons. Annual sediment being delivered to this point after the installation period will be reduced from 250,800 tons to approximately 218,531 tons. This is a reduction of 13 percent. This reduction not only reflects the reduction in sheet erosion, but also reflects the trapping effect of the weirs that will be installed. Allowances for sediment were made in the design of these structures. The graph and chart on the following pages will illustrate these reductions by evaluation units and areas.

Several channel features and construction procedures will reduce the amount of sediment derived from channel construction and insure channel stability.

1. Channel work will be done so that it affects only one bank.

2. Vegetative cover will be established immediately after construction. An estimated average of 2,167 tons of sediment per year for 6 years will be generated by construction and would normally be delivered to Bayou des Cannes.

3. Weirs will be constructed prior to channel work upstream from them, and will trap a large percentage of sediment produced during construction. Project-induced sediment will be offset by the reduction in volume of sediment from sheet erosion that will be achieved by land treatment and structural measures.

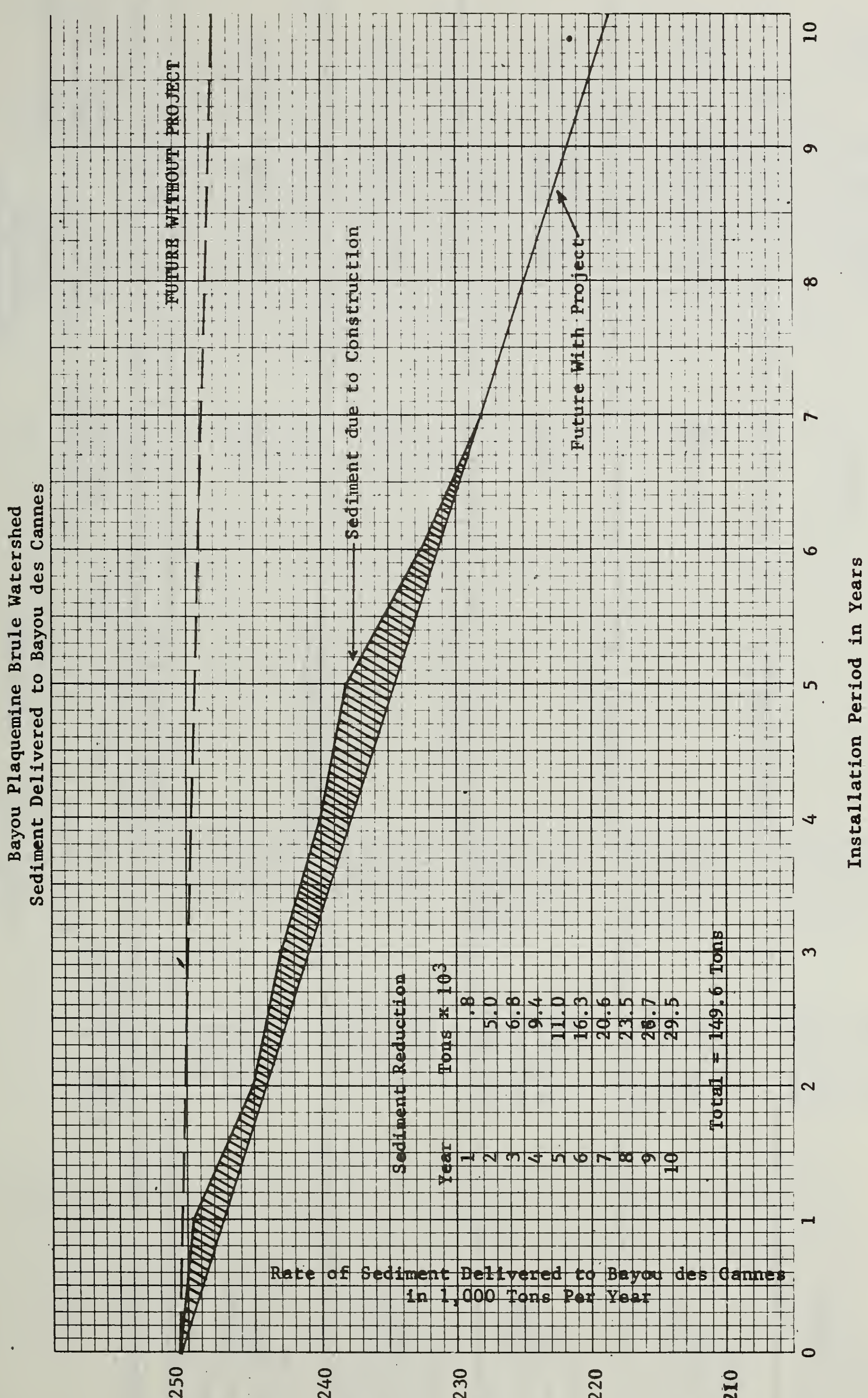
4. Channel design velocities are commensurate with the materials to be encountered during construction.

5. Channel side slope designs will insure stable banks.

6. Where possible, project channels will empty into undisturbed vegetated channels which will act as filtering agents. Details of these measures are in the INVESTIGATIONS AND ANALYSES, Engineering Investigations section of the work plan.

Fish and Wildlife

As a result of modification of 229 miles of channels, there will be a decrease in the amount of time that water will flow in the ephemeral channels because of increased capacity. Also, there will be more rapid fluctuation of the water levels in these channels.


Bayou Plaquemine Brule Watershed
Sediment Delivered to Bayou des Cannes
FUTURE WITHOUT PROJECT
Sediment due to Construction
Future With Project
Sediment Reduction
Year Tons x 103
1 .8
2 5.0
3 6.8
4 9.4
5 11.0
6 16.3
7 20.6
8 23.5
9 26.7
10 29.5
Total = 149.6 Tons
Rate of Sediment Delivered to Bayou des Cannes
in 1,000 Tons Per Year
250
240
230
220
210
0
1
2
3
4
5
6
7
8
9
10
Installation Period in Years

EROSION AND SEDIMENT REDUCTION

	Sheet Erosion (tons/year)	Sediment Delivered to Bayou Plaquemine Brule (tons/year)	Sediment Delivered to Bayou des Cannes (tons/year)	Construction Sediment (tons)	Construction Sediment to Bayou Plaquemine Brule (tons)		Construction Sediment to Bayou des Cannes (tons)
EVALUATION UNIT I							
Present	98,418	26,573					
Future Without	99,489	26,862		4,952	2,476	3rd yr	2,228
Future With	91,252	24,638					
Reduction	8,237	2,224					
EVALUATION UNIT II							
Present	41,252	18,563					
Future Without	41,378	18,620		1,560	1,092	2nd yr	983
Future With	37,748	14,439					
Reduction	3,630	4,181					
EVALUATION UNIT III							
Present	372,697	104,355					
Future Without	365,620	102,374		6,127	1,225	1st yr	612
Future With	339,892	80,895			1,225	6th yr	612
Reduction	25,728	21,479					
EVALUATION UNIT IV							
Present	270,974	130,068					
Future Without	269,065	129,151		21,208	2,651	1st yr	1,325
Future With	244,902	94,042			7,953	5th yr	3,975
Reduction	24,163	35,109					
EVALUATION UNIT V							
Present	357,056	142,822					
Future Without	352,311	140,924		11,670	1,362	1st yr	544
Future With	319,861	127,944			6,808	4th yr	2,723
Reduction	32,450	12,980					
TOTAL WATERSHED							
Present	1,140,000	422,381	250,800				
Future Without	1,127,863	417,931	248,130	45,517	24,792		13,002
Future With	1,033,655	341,958	218,531				
Reduction	94,208	75,973	29,599				

Although the fisheries are of low quality in the intermittent channels, project work will have some detrimental effects where construction occurs. Turbidity and suspended solids concentrations in the area of construction and in waters immediately downstream from channel construction will increase temporarily during construction. Removal of cover, potholes, and areas of attachment for the benthic organisms will result in the biological productivity being lowered slightly. Recovery of the biological productivity to near its original conditions should occur within 1 to 2 years depending upon the recovery of the benthic community, the water quality, and adequate cover in channels to preproject condition.

The predominance of commercial species such as catfish, buffalo, carp, gar, and shad should not change since these species are able to tolerate the existing poor water quality.

Channels will be enlarged in 6 miles of ponded water. Five miles have been previously worked; 1 mile is a natural, unmodified channel. Project construction will cause most potholes, channel cover, and bank cover on one side to be removed. Water temperature will increase slightly because some trees and other bank vegetation will be removed. Phytoplankton and benthic organism production will be interrupted until preproject conditions return. The biological productivity will decrease slightly but the species composition or diversity will remain unchanged. The rate of recovery of the biological productivity will be similar to that of the intermittent channels.

Approximately 193 miles of the 218 miles of ephemeral channels to be worked will be enlarged and 25 miles will be cleared. All of the ephemeral channels have been previously worked except 1 mile. Fish populations are insignificant in the ephemeral channels because they have water for only a short duration after a rain and are usually dry at other times. However, important lower food chain organisms such as aquatic insects, amphibians, and crustaceans are produced in these channels. The effect of project construction will reduce the amount of these organisms temporarily. These organisms will recover to near their original populations as the habitat recovers to previous condition.

Seven structures for water control (weirs) will be installed to minimize damages to fish and wildlife as a result of the project. They will be installed prior to construction of channels upstream from them. These structures will have several beneficial effects on the aquatic ecosystem. The 33 acres of ponded water upstream from the weirs will increase the amount of fish production by 15 pounds of fish per acre. Also, increased aquatic habitat for amphibians, reptiles, and wading birds will be provided. Since these structures are designed to act as sediment traps, some of the sediment induced

will be confined to construction areas and should settle in ponded water behind the weirs. The amount of sediment trapped depends upon rainfall and flow conditions at time of construction. Another function of the structures is to reduce vegetative maintenance needed in the channels. This will reduce the amount of disturbances to the aquatic ecosystem in the future. However, shallow water in the upper portions of the ponded water may have occasional growths of undesirable aquatic plants.

Periodic blue-green algae blooms could occur during extended periods of low flow. However, the channel drainage area at the weirs is large enough to provide a frequent flushing action except during extended dry periods. Anabaena and Microcystis would be the most likely algal species associated with prolonged dry periods. If these blooms materialize, the algae give off a toxic substance which can be fatal to fish. Also, when the bloom dies, the process of decomposition can cause an oxygen shortage and be fatal to fish. The Sponsoring Local Organizations will be responsible for identifying problem areas and will consult with local fisheries biologists for the action needed to alleviate the problem. Copper sulfate or its derivatives will be used to control the algal blooms.

The 33 acres of permanent water created by the seven weirs will have an average surface area of 4.7 acres, and an average depth of 1.7 feet. Because of the shallow water at these sites, and the small size of these impoundments, they offer poor quality water-based recreation. Most of the weir sites are fairly inaccessible to the general public. Consequently, no recreation developments such as boat ramps are anticipated at these sites. However, improved boat launching facilities and parking areas are needed along Bayou Plaquemine Brule and Bayou Wikoff but none are planned for this project.

Turbidity and concentrations of suspended solids will temporarily increase in the upper portion of Bayou Plaquemine Brule because of construction near Church Point and at project channel outlets into Bayou Plaquemine Brule. However, since no work is planned in the 24-mile reach having perennial flow, and in only 3 miles of the 23-mile reach having intermittent flow, project effect on the water quality as a whole will be minor. Preproject monitoring studies have shown that the water in Bayou Plaquemine Brule already has high suspended solids, high turbidities, and high colors. (Refer to water quality data in WATERSHED RESOURCES-ENVIRONMENTAL SETTING). Poor water quality presently causes commercial fish species to predominate. These species are adapted to poor water quality and will not be detrimentally affected by temporary increases in turbidity in Bayou Plaquemine Brule.

Bayou Plaquemine Brule flows into Bayou des Cannes, which flows south approximately 1.5 miles into the Mermentau River near the town of Mermentau. Because of the size of Bayou Plaquemine Brule Watershed (234,400 acres) as compared to the Mermentau River Basin (2,217,000 acres), project construction is not expected to significantly affect the the water quality of the Mermentau River-Lake Arthur-Grand Lake complex. No work is planned for the entire 24-miles perennial portion of Bayou Plaquemine Brule, and only 3 miles of the intermittent portion will be worked. The Mermentau River already has poor water quality conditions. (See tabulation in <u>WATERSHED RESOURCES-ENVIRONMENTAL SETTING</u>.) The lower undisturbed reach of Bayou Plaquemine Brule, downstream from Church Point, will settle out most of the sediment generated from construction. The amount of sediment (approximately 24,792 tons) will be more than offset by the reduction in sediment derived from sheet erosion (approximately 75,973 tons per year). It is not anticipated that this reduction will cause any major change in the maintenance program in Bayou Plaquemine Brule. The project is not expected to cause any significant changes in the environment downstream from project measures. Increased use of soil conserving practices and engineering structures by landowners under the accelerated land treatment program will reduce the annual loss of soil by sheet erosion from 1,140,000 tons per year under preproject conditions to 1,033,655 tons per year with the project. Studies in various parts of the country have shown that soil conservation practices reduce erosion and sediment delivery rates. "The amount of sediment coming from watersheds having good conservation treatment at the Blackland Experimental Watershed, near Riesil, Texas, is only 12 percent of that from watershed farmed without soil conserving practices."2/

Usually, nitrogen and phosphorus are the elements that limit plant growth. These nutrients enter surface water by discharge of raw or treated sewage, industrial wastes, erosion and leaching from the soil.3/ When these nutrients become too abundant in water, they become problems in that they cause undesirable growth of aquatic plants of algae "blooms."

The best methods of preventing excessive fertilizer nutrients from entering the aquatic ecosystem is to apply only the proper amount at the proper times and to use soil conservation practices that will reduce erosion to a minimum. These practices will be applied under the accelerated land treatment program of the project. As a result, the rate of eutrophication in watershed channels is not expected to increase.

2/ U.S. Department of Agriculture, Agricultural Research Service, <u>Wastes in Relation to Agriculture and Forestry</u>, Miscellaneous Publication No. 1065 (Washington: U.S. Government Printing Office, 1968), p. 36.

3/ <u>Ibid.</u>, p. 7.

The effects of pesticides usage on fish and wildlife is a complex problem and knowledge in many areas is still limited.[4] However, research has shown that the chlorinated hydrocarbons, such as DDT and its metabolites (DDD and DDE), aldrin, dieldrin, endrin, chlordane, BHC (benzene hexachloride) and toxaphene are the more detrimental pesticides to fish and wildlife species. This is because of their long-term persistence in the environment and their capacity to accumulate in body tissues which leads to the "biological magnification" of their concentrations through the food chains of predatory fish and wildlife.

Data gathered in one sampling period in the pesticide usage survey as explained under WATER AND RELATED LAND RESOURCE PROBLEMS, Fish and Wildlife section, indicates that 17 different pesticides are currently being used by farmers in the watershed. The chemicals used include 11 herbicides (one is a mixture), 5 insecticides, and 1 fungicide. The five insecticides include aldrin, carbofuran, methyl parathion, carbaryl, and toxaphene. A recent study indicated that the residue levels of pesticides in the environment are related to pesticide usage. Data from one sampling period of the Soil Conservation Service's Monitoring Program (which is explained in INVESTIGATIONS AND ANALYSES) show the following pesticides residues in fish tissues:

BHC (white crappie had .01 ppm and short nose gar had .02 ppm)
DDT (white crappie had .13 ppm and short nose gar had 2.69 ppm)
Toxaphene (white crappie had .27 ppm and short nose gar had 4.2 ppm)
Dieldrin (bluegill had .04 ppm and short nose gar had .57 ppm)

Gizzard shad were also analyzed for the above pesticides and levels ranged in between the low and high listed for white crappie, short nose gar, and bluegill. Bottom sediment contained DDT (0.09 ppm to 0.13 ppm) and dieldrin (0.0 ppm to 0.01 ppm). Results of chlorinated hydrocarbon residues detected in the water samples from similar watersheds indicate these residues are below 1 ppb. Another study indicated that DDT and its metabolites had 0.35 - 0.48 ppm residue in fish in the Mermentau River.[5] Comparing the amount of pesticide

---

4/ U.S. Department of the Interior, Fish and Wildlife Service, Bureau of Sport Fisheries and Wildlife, Handbook of Toxicity of Pesticides to Wildlife, Resource Publication No. 84 (Washington: U.S. Government Printing Office, 1970), p. 1.

5/ E. A. Epps et al., "Preliminary Report on a Pesticide Monitoring Study in Louisiana," Bulletin of Environmental Contamination and Toxicology, Vol. 2, No. 6 (New York: Springer-Verlog, Inc., 1967), p. 38.

residues measured in fish and bottom samples with the pesticides currently being used indicates a change in the kinds of pesticides being applied. Chlorinated hydrocarbons such as DDT and its metabolites, BHC, and dieldrin are not currently being used but, because of their application in past years and persistence in the environment, are still present in fish and sediment. According to data from the 1973 monitoring, five insecticides that were used included aldrin, carbofuran, methyl parathion, carbaryl, and toxaphene. Aldrin, carbofuran, and methyl parathion were used by the majority of farmers interviewed. Data gathered from this initial survey indicates a trend away from the highly persistent chlorinated hydrocarbon group to less residual, more biodegradable types of insecticides such as organophosphates and carbamates.

Use of pesticides is anticipated to increase slightly with the project. However, increased use of land treatment practices will be applied that will reduce erosion and sediment rates which will, in turn, reduce the amount of pesticides that enter the channels and bayous. In addition to land treatment, correct application of these chemicals in proper amounts is important in limiting the amount entering the environment.

Project action will not affect the existing ponds, lakes, or Type 5 wetlands. No ponds or lakes are planned for project construction. However, there will be 33 acres of permanent water created as a result of the project. Project construction will have some effect on the 12,272 acres of Type 1 wetlands. The project will effect about 560 acres of Type 1 wetlands (seasonally flooded hardwoods) by reducing the amount of water introduced onto the wetlands as a result of overbank flooding from low intensity rainstorms. This will reduce the value of the fringes of these wetlands as feeding areas for waterfowl. However, the channels in wetland areas were designed so that the amount and duration of water on the wetlands as a result of direct precipitation will not be affected. The channel designs allow for excessive overbank flow through these areas during the design storm and will not provide additional adequate drainage and flood prevention sufficient for these areas to be cleared and farmed. The affected Type 1 wetlands are along the upper floodplains of Bayou Jonas and Cole Gully. The lower 2 miles of construction on Bayou Jonas will not affect the wetland through which it passes because the flooding in this area is determined by backwater from Bayou Plaquemine Brule.

In addition, there will be a loss of the vegetation on about 40 acres of Type 1 wetlands due to conversion to channel rights-of-way. This loss will be along 8 miles of channel banks, mainly Bayou Jonas, Cole Gully, Prather Gully, and the lower ends of a few other small channels. However, access to these areas will be improved with the provision of berms for channel maintenance.

EFFECTS

As a result of project installation, forest land will be reduced 90 acres. This will result in the commitment of 15 acres, 34 acres, and 41 acres of forest to channels, spoil, and berms, respectively. Although the 90 acres is relatively small, its loss will adversely affect forest wildlife species such as deer, squirrels, wood ducks, woodcock, swamp rabbits, and nongame species which depend on the forest land for essential habitat requirements. Bottom land hardwoods provide the most productive habitat for deer and squirrels. Woodcock, swamp rabbits, and nongame species utilize forest habitat for feeding and cover requirements. Wood ducks utilize nesting, feeding, and brood cover that is available in forest land. For the effects that the loss of forest habitat will have on wildlife populations, refer to the tabulation on page 103, "Changes in Habitat and Estimated Game Population Because of Project Construction." The 34 acres of spoil in the forest land will be planted with hardwood seedlings such as water oak, sweet pecan, and willow oak to mitigate the loss of forest habitat. Vegetation of the spoil and berms will make the channels more aesthetically pleasing than if they were left unvegetated. Plants with wildlife, conservation, and aesthetic value will be used to revegetate these areas.

Cottontail rabbits utilize both open land and forest land for habitat requirements. Open land in agricultural areas furnishes much of the rabbit's food supply; forested or brushy areas such as wooded channel banks provide protective cover. Cottontails will be adversely affected by the 76 acres of open land, forest and wooded channel banks converted to channels. However, converting land to spoil and berms will not detrimentally affect rabbit populations since these areas will be as good as preproject habitat once vegetation is reestablished. Berms and spoil will be seeded to some food plants such as ryegrass and other tender vegetation for rabbits and other wildlife species. The stages of natural plant succession that will develop along the spoil provides excellent habitat for rabbits and other wildlife species.

Open land wildlife species will be benefited by project action. The conversion of forest land and wooded channel banks to spoil and berms will increase the amount of open land habitat by 109 acres. This change as a result of the project will increase doves, quail and other nongame species populations. However, these increases will be of a temporary nature for species such as doves and quail. For a period of approximately 2 to 3 years, the vegetation established on the berms and spoil will have food value for doves and quail. After this period, the process of plant succession will cause these

areas to decrease in the quality of habitat they provide, especially to doves. Quail will still feed to some extent in these areas since they are scratching-type feeders using grown-up areas more than doves. Also, quail, rabbits, and other wildlife species will utilize the latter stages of plant succession on the spoil for protective and nesting cover. Due to the relatively small amount of this type of cover in the area, it is an extremely important part of their habitat.

The tabulation on the following page gives the habitat changes and estimated fish and game population changes as a result of project construction.

The conversion of forest land to channels, berms, and spoil may cause a minor loss of habitat for some "endangered" wildlife species. Since the remaining forest land habitat is not expected to undergo any additional postproject changes, and since most individuals of these species inhabit extensive territories, no significant effects to the "endangered" wildlife species should result from the project. However, the cumulative effects of minor changed land use nationwide as a result of this project and additional projects, could have detrimental effects on the "endangered" species because of the combined loss of valuable habitat.

Usually, crawfish production is considered an agricultural crop, but it will be discussed with fish and wildlife. Project action is not expected to affect any of the existing crawfish production. According to the "Summary of Crawfish Farmers of Louisiana,"[6/] Acadia Parish has 20 crawfish farms with 1,100 acres of crawfish production and St. Landry Parish has 2 crawfish farms for a total of 600 acres. Of this 1,700-acre total in both parishes, there are 19 crawfish ponds with a total of 550 acres in the watershed.

Economic and Social

Agriculture, the economic base of the watershed, will be enhanced. The project will increase agricultural development, which will increase the profits of processors and sellers of agricultural products as well as other goods. The economy of the area will be enhanced by the higher salaries of those presently employed and those hired to do the additional work.

6/ U.S. Department of Agriculture, Soil Conservation Service, Summary of Crawfish Farmers of Louisiana (Unpublished data, October 1973).

CHANGES IN HABITAT AND ESTIMATED GAME POPULATION
BECAUSE OF PROJECT CONSTRUCTION

Species	Habitat	Acres Gained or Lost	Number of Animals
Doves (Migratory)[a]	Open land	+109	+327
Quail[a]	Open land	+109	+ 13
Rabbit	Open land and forest land[b]	- 76	- 25
Squirrel	Forest land	- 90	- 90
Deer	Forest land	- 90	- 1
Waterfowl (Migratory)	Open land and forest land[c]	-140	- 7
Waterfowl (Resident)	Forest land and open land[c]	-140	- 2

[a] Temporary gains
[b] Includes acres of open land, wooded channel banks, and forest land converted to channels
[c] Includes acres of open land converted to channels and total amount of forest land lost.

ESTIMATED STANDING CROPS OF FISHES

Category	Pre-Project Acres	Pre-Project Total Pounds	Post-Project Acres	Post-Project Total Pounds	Acres Gained Or Lost	Pounds Of Fish
Ponds and lakes	142	21,300	142	21,300	-0-	-0-
Intermittent Channels	251	6,275	252	6,300	+ 1	+ 25
Existing Ponded Water Channels	89	6,230	89	6,230	-0-	-0-
Perennial Water	290	37,700	290	37,700	-0-	-0-
Weirs	-0-	-0-	33	495	33	495
TOTAL		71,505		72,025	34	520

The higher level of protection, the reduced fixed cost of production, and the increased quality of products will give farmers an incentive to increase production inputs. They will buy better quality seed and will use more fertilizer and lime. Expenditures for products used in harvesting and hauling the product to market will increase. This will stimulate economic activity within the watershed and in the surrounding areas. More jobs will be created in the processing and service industries. The value of property will increase, which will increase the tax base. Thus, the parishes will have more funds to develop health, recreational, educational, and other needed facilities.

Installation of the project will create about 89 man-years of local labor for a 6-year period. The expenditure of $3,349,300 for the installation of land treatment measures will create an additional 96 man-years of labor over a 10-year period. Operation and maintenance will provide 200 man-years of local labor for the life of the project.

The project will help slow the trend of decreasing number of farms and increasing size of farms. With the project, optimum-sized labor saving equipment will be more efficiently used on the farms. This and other factors will decrease costs and increase yields, thereby increasing the profitability of farming and will cause farming to be more competitive for labor with other industries, thereby slowing the out-migration trend.

The gross sales of farm products are expected to increase approximately 10 percent. The average annual overall net farm income will increase about $900 per farm. With this increased and more stable income, the farmer may improve his house or buy a better automobile. He will be able to afford better dental and health care, more insurance, better clothes, and other amenities of life for his family. He will be able to pay higher wages to his employees who will then be able to improve their living conditions.

The problems to watershed residents caused by flooded roads will be reduced. School buses will be able to travel their scheduled routes more regularly which will improve school attendance. The public will be better able to utilize the roads for farming operations and marketing and for commuting to places of employment and business during wet periods. Nuisance damages to residences will be reduced.

Local traffic patterns will be interrupted temporarily during the replacement of bridges and culverts resulting in inconveniences to the people involved. Detour routes will be available such that no one will be deprived of access to their destination. Noise

levels will increase at the construction sites. Increases in turbidity will occur downstream temporarily until the exposed areas are revegetated.

Local secondary benefits will accrue after the installation of project measures. The values added to the immediate products and services as a result of activities stemming from or induced by the project will enhance the overall local economy. The increased production of goods stemming from the project will place new demands on the processing, transporting, and marketing industries within the area. Processors, business establishments, and other individuals not directly benefited, will profit from increased sales of their agriculturally-associated goods and products. Suppliers of the additional materials and services required as a result of project-related activities will realize an increased net income. The increased production of goods and services induced by the project will stimulate local and regional economic activity. Although some agricultural products are processed within the watershed, most are processed outside of the watershed, increasing economic activity in the region.

The project will reduce damages significantly to 40 residences, 11 commercial properties and an industrial complex in the town of Church Point. These damages are in the form of income loss, maintenance and repair costs, and many of the inconveniences caused by flooding. Project installation will improve the overall socio-economic environment of the town of Church Point.

PROJECT BENEFITS

Project measures will reduce flood damages $939,800 annually (table 5). These benefits include $702,900 reduction in crop and pasture damages; $4,500, residential; $30,600, commercial; $1,200, industrial; $145,900, road and bridge; $54,700, indirect damages include certain losses that result from flooding even though the property involved was not flooded. In addition, farmers will be able to install effective on-farm drainage measures and consequently realize $702,900 annually in drainage benefits (see table 6). Also resulting from project installation are more intensive use benefits, amounting to $156,100; redevelopment benefits, amounting to $48,000; and local secondary benefits, amounting to $213,500. Benefits stemming from more intensive use of cropland reflect increases in yields resulting from increases in efficiency of farming operations and increases in production inputs. Redevelopment benefits result from the use of underemployed and unemployed local labor and represent wages paid for operation and maintenance of project works. The local secondary benefits displayed in this plan represent those values added over and above the immediate monetary effects of the project as a result of activities attributed to the project.

Secondary benefits from a national viewpoint will accrue to this project, but these were not evaluated. Other benefits will accrue in the watershed as indicated in the EFFECTS OF WORKS OF IMPROVEMENT section. However, no attempt was made to attach monetary value to these.

COMPARISON OF BENEFITS AND COSTS

Average annual benefits from project structural measures are estimated to be $2,060,800 (table 6). Average annual cost of structural measures (amortized installation cost plus operation and maintenance) is estimated to be $391,200. Average annual benefits excluding secondary benefits are estimated to be $1,847,300. The benefit-cost ratio with secondary benefits included is 5.3 to 1; the benefit-cost ratio without secondary benefits is 4.7 to 1.

PROJECT INSTALLATION

The project measures will be installed during a 10-year period. Land treatment will be installed during the entire 10 years; structural measures will be installed in the first 6 years. The Sponsoring Local Organization understands its obligations and has agreed to carry out the work during this period.

The Acadia and the St. Landry Soil and Water Conservation Districts will provide the overall leadership necessary for the application of the land treatment measures. Landowners and operators will be encouraged to apply and maintain all needed measures on their land. A study of completed projects with purposes similar to this plan shows that land treatment planned during the project installation period can be accomplished. Plans for their installation and maintenance will be outlined with each landowner. The agreed-to items will be identified in a conservation plan which will be executed between the individual and the soil and water conservation district.

The Acadia and the St. Landry Parish Police Juries and the 11 involved drainage districts will be responsible for installing all other structural measures. They will be responsible for the local share of cost of construction, acquiring necessary land rights, obtaining improvement changes to all roads, bridges, culverts, utilities, and other existing improvements which are needed, and advertising, awarding and administering contracts. These police juries and drainage districts have power of expropriation and have agreed to use this power as necessary to obtain needed land, easements, and rights-of-way. Land easements and rights-of-ways will be acquired by using Louisiana revised statute 38:113, signing of flowage easements, and when necessary, by fee simple title. Appraisals necessary for purchasing easements will be acquired through reputable land and property appraising institutions. Construction permits are required by the U.S. Army Corps of Engineers (Engineering Regulation No. 1165-2-302) for channel work to be done on Bayou Plaquemine Brule and on channels tributary to the Bayou. These permits will be obtained by the Sponsoring Local Organization prior to the installation of any structural measures.

The nine involved drainage districts in Acadia Parish will allow the Acadia Parish Police Jury to do all of the contracting for works of improvement within their districts. However, some of the drainage districts will perform certain elements of the project work with their own labor, equipment, and materials in lieu of providing cash. The drainage districts have the equipment, experienced operators, and maintenance men needed to do channel excavation and clearing. They do not, however, have trained personnel and necessary equipment

needed to install grade stabilization structures and structures for water control.

The Service will provide for all necessary engineering services required for installation of the planned measures.

The two involved drainage districts in St. Landry Parish will do the contracting for the project works of improvement within these districts.

Each drainage district will be responsible for the local share of the construction cost for channels within the drainage district. The district's share will be that portion of the total construction cost based on the percent of the channel length within its district.

FINANCING PROJECT INSTALLATION

Federal assistance will be provided under the authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83d Congress, Stat. 666) as amended. This assistance is subject to appropriation of funds.

Landowners and operators, with aid from Federal and State programs, will bear the expense of applying land treatment measures. The Soil Conservation Service will provide technical assistance under going programs. Funds for the acceleration of technical assistance necessary to insure timely installation of land treatment measures and for soil surveys will be provided by Public Law 566.

The Louisiana Department of Public Works has agreed to provide funds for the local share of cost of structural measures contingent on the appropriation of monies for this purpose by the Louisiana Legislature. The local Sponsors recognize, however, that these funds may not be available or that additional funds may be required. They will be responsible for obtaining additional financing as necessary through normal funding procedures such as taxes or bond issues.

The project Sponsors responsible for managing the finances of work in which the Soil Conservation Service has a financial interest will develop and maintain a financial management system. This system will contain provisions for maintaining accurate, current and complete disclosure of financial transactions, budgetary actions and provision for audits. The system will be developed in accordance with and contain provisions set forth by Soil Conservation Service policy.

PROVISIONS FOR OPERATION AND MAINTENANCE

Operation and maintenance of all phases of the completed project will be the responsibility of the appropriate Sponsoring Local Organization. The Acadia and the St. Landry Soil and Water Conservation Districts, with technical assistance from the Soil Conservation Service, will assist and encourage landowners to install and maintain land treatment measures. The objectives will be to maintain adequate drains, ground cover, and other practices which will protect and conserve soil and water resources.

Operation and maintenance of all phases of the completed structural measures will be the responsibility of the individual drainage districts. In addition to maintaining the 250 miles of channels with appurtenant structures proposed in the plan, they will continue to maintain the present flow conditions of those channels that are now adequate (126 miles) as indicated on the Project Map, Figure 8. There are 206 miles of channels and appurtenant structures in Acadia Parish and 44 miles in St. Landry Parish. The methodical operation and maintenance of structural measures will insure proper functioning of these measures and realization of benefits.

The present district maintenance tax for drainage is considered adequate for maintaining channels and associated works. Should these funds prove inadequate, the Sponsors have agreed to provide additional financing by an increase in revenue from normal taxing procedures.

Channel maintenance includes periodic cleanouts necessary to restore channels to their planned capacities, repair of bank erosion, control of vegetation, and repair or replacement of appurtenant structures. Maintenance of structures for water control and grade stabilization structures including repairing rills around headwalls or wingwalls, replacing rock riprap as needed, maintaining or replacing vegetation on fills, repairing or replacing worn or broken parts, replacing short-life parts and all other activities essential to the safety and functioning of the structure. Improvement of the aesthetics of the channel and structure sites shall be considered an important feature of the maintenance program.

Annual operation and maintenance expenses for the 250 miles of project channels, including the replacement of worn out or obsolete parts, are estimated to be $87,000. The annual cost for Acadia Parish is $72,200 and for St. Landry Parish is $14,800. The estimated cost of maintaining the 126 miles of adequate channels is $75,000, of which $60,400 is for Acadia Parish and $14,600 is for St. Landry Parish. These two parishes will incur this total cost and will maintain these channels at adequate capacity.

Existing public roads, farm roads, turn rows, trails, open areas, and other existing facilities will be used for maintenance equipment to reach the channels. Sufficient access will be available to properly maintain all channels. The channels will be kept clear of excessive vegetation by mowing, hand labor, and use of approved herbicides. The herbicides will be used in areas where mowing and hand labor are not practical. Spraying will be accomplished in the summer months when the ephemeral channels and the intermittent channels are most likely to have the least flow. Spraying during these months will lower the probability of runoff carrying undegraded herbicides into other areas. Eroded banks, side inoets, and other appurtenances will be repaired when in need. Localized sediment accumulations in channels, with and without weirs, will be removed periodically by mechanical means.

Vegetation remaining on channel banks not disturbed during construction will be maintained. Trees left in channel rights-of-way for landscape purposes and those planted on spoil banks in the forest areas will not be destroyed by maintenance methods. Two complete mechanical cleanouts are anticipated during the life of the project. The amount of sediment to be removed each time will be small enough to be placed and smoothed on the channel berm.

Provisions will be made for representatives of the Soil Conservation Service, the Louisiana Department of Public Works, and the Sponsors to have free access to all portions of the project measures at any reasonable time for the purpose of inspection, repair, and maintenance. The Sponsors, together with representatives of the Soil Conservation Service, will make a joint inspection annually, after severe storms, and after the occurrence of any other unusual condition that might adversely affect the structural measures.

These joint inspections will continue for 3 years following installation of the structural measures. Inspection after the third year will be made by the Sponsors. They will prepare an annual report and send a copy to the Soil Conservation Service. Items of inspection will include, but will not be limited to, (1) conditions of vegetative cover and growth, (2) need for removal of sediment bars and debris accumulations, (3) brush control in channels, (4) structures for water control (pipe drops and weirs), and (5) general conditions.

The Sponsoring Local Organization fully understands its obligation for operation and maintenance and will execute a specific operation and maintenance agreement with the Soil Conservation Service prior to the execution of the project agreement for the installation of project measures.

TABLE 1 - ESTIMATED PROJECT INSTALLATION COST

Bayou Plaquemine Brule Watershed, Louisiana

	Unit	Number Non-Federal Land	Estimated Cost (Dollars)1/ P.L. 566 Funds SCS3/	P.L. 566 Funds Total	Other SCS3/	Other Total	TOTAL
Land Treatment2/							
Cropland	Acres to	114,300	-	-	2,460,900	2,460,900	2,460,900
Pastureland	be treated	4,900	-	-	185,100	185,100	185,100
Other Land		4,800	-	-	270,600	270,600	270,600
Technical Assistance			238,100	238,100	194,600	194,600	432,700
Total Land Treatment	xxx	xxx	238,100	238,100	3,111,200	3,111,200	3,349,300
Construction Measures							
Construction							
Channel Work4/							
Other							
(N)	Miles	2	16,875	16,875	5,625	5,625	22,500
(M)	Miles	224	2,017,725	2,017,725	672,575	672,575	2,690,300
Channel M-1							
(M)	Miles	3	386,000	386,000	-	-	386,000
Subtotal-Construction			2,420,600	2,420,600	678,200	678,200	3,098,800
Engineering Services			216,900	216,900	-	-	216,900
Relocation Payments			-	-	-	-	-
Project Administration							
Construction Inspection			310,100	310,100	-	-	310,100
Other			307,180	307,180	34,120	34,120	341,300
Relocation Assistance							
Advisory Services			-	-	-	-	-
Subtotal-Administration			617,280	617,280	34,120	34,120	651,400
Other Costs							
Land Rights			-	-	1,090,400	1,090,400	1,090,400
Subtotal-Other					1,090,400	1,090,400	1,090,400
Total Structural Measures			3,254,780	3,254,780	1,802,720	1,802,720	5,057,500
TOTAL PROJECT			3,492,880	3,492,880	4,913,920	4,913,920	8,406,800

1/ Price base 1974
2/ Includes only areas estimated to be adequately treated during the project installation period. Treatment will be accelerated throughout the watershed, and dollar amounts apply to total land area, not just adequately treated areas.
3/ Federal agency responsible for assisting in installation of works of improvement.
4/ Type of channel before theproject: (N) - an unmodified, well-defined natural channel or stream; (M) - manmade ditch or previously modified channel.

June 1974

Table 1A - Status of Watershed Works of Improvement
Bayou Plaquemine-Brule Watershed, Louisiana

	Unit	Applied to Date	Total Cost 1/ (Dollars)
LAND TREATMENT			
Bedding	Acs.	250	7,500
Conservation Crop System	Acs.	129,176	387,500
Contour Farming	Acs.	130	400
Crop Residue Mgnt.	Acs.	71,188	142,400
Disposal Lagoon	No.	2	2,400
Ponds	No.	185	74,000
Irrigation Field Ditch	Ft.	2,389,727	716,900
Fish Pond Mgnt.	No.	180	1,800
Grade Stab. Structure	No.	102	15,300
Irrigation Pipeline	Ft.	55,097	220,400
Irrigation System	No.	324	324,000
Irrigation Water Mgnt.	Ac.	43,745	87,500
Irrigation Land Leveling	Ac.	8,668	260,000
Land Smoothing	Ac.	69,554	695,500
Dr. Main & Lateral	Ft.	560,000	168,000
Pasture & Hayland Mgnt.	Ac.	4,653	27,900
Pasture & Hayland Planting	Ac.	1,363	68,100
Access Road	Ft.	800	4,000
Rec. Area Improvement	Ac.	12	700
Str. for Water Control	No.	620	62,000
Dr. Field Ditch	Ft.	820,000	82,000
Well	No.	98	49,000
Wildlife Wetland Habitat Mgnt.	Ac.	735	700
Land Adequately Treated	Ac.	48,400	-
Total			3,398,000

1/ Price base 1974.

June 1974

TABLE 2 - ESTIMATED STRUCTURAL COST DISTRIBUTION

Bayou Plaquemine Brule Watershed, Louisiana

(Dollars)1/

Item	Installation Cost - P.L. 566 Funds: Construction	Installation Cost - P.L. 566 Funds: Engineering	Installation Cost - P.L. 566 Funds: Total Public Law 566	Installation Cost - Other Funds: Construction	Installation Cost - Other Funds: Land Rights	Installation Cost - Other Funds: Total Other	Total Installation Cost4/
Channel Work2/							
Evaluation Unit I							
(N)	9,675	900	10,575	3,225	1,800	5,025	15,600
(M)	347,550	32,500	380,050	115,850	149,400	265,250	645,300
Subtotal-Unit I	357,225	33,400	390,625	119,075	151,200	270,275	660,900
Evaluation Unit II							
(M)	181,575	16,900	198,475	60,525	61,100	121,625	320,100
Subtotal-Unit II	181,575	16,900	198,475	60,525	61,100	121,625	320,100
Evaluation Unit III							
(N)	7,200	600	7,800	2,400	2,000	4,400	12,200
(M)	301,200	28,100	329,300	100,400	188,700	289,100	618,400
Subtotal-Unit III	308,400	28,700	337,100	102,800	190,700	293,500	630,600
Evaluation Unit IV							
(M)	761,550	71,100	832,650	253,850	454,300	708,150	1,540,800
Subtotal-Unit IV	761,550	71,100	832,650	253,850	454,300	708,150	1,540,800
Evaluation Unit V							
Other							
(M)	425,850	39,800	465,650	141,950	204,800	346,750	812,400
Channel M-1							
(M)	386,000	27,000	413,000	-	28,300	28,300	441,300
Subtotal-Unit V	811,850	66,800	878,650	141,950	233,100	375,050	1,253,700
Project Administration	xxx	xxx	617,280	xxx	xxx	34,120	651,400
Grand Total	2,420,600	216,900	3,254,780	678,200	1,090,4003/	1,802,720	5,057,500

1/ Price base 1974.

2/ Type of channel before the project: (N) - an unmodified, well-defined natural channel or stream; (M) - manmade ditch or previously modified channel.

3/ Includes $334,200 for value of land, legal fees, and surveys; $533,800 for replacement or modification of bridges and culverts; and $222,400 for modification of pipelines, utility lines, and miscellaneous facilities.

4/ The cost of this work, includes channel work (excavation and clearing), appurtenant grade stabilization structures, structures for water control and vegetative plantings.

June 1974

TABLE 2A - COST ALLOCATION AND COST SHARING SUMMARY

Bayou Plaquemine Brule Watershed, Louisiana

(Dollars)1/

Item	Cost Allocation			Cost Sharing					
	Purpose			Public Law - 566			Other		
	Flood Prevention	Drainage	Total	Flood Prevention	Drainage	Total	Flood Prevention	Drainage	Total
Multiple Purpose Channel Work	1,982,400	1,982,400	3,964,800	1,451,350	773,150	2,224,500	531,050	1,209,250	1,740,300
Single Purpose Channel Work	441,300	-	441,300	413,000	-	413,000	28,300	-	28,300
TOTAL	2,423,700	1,982,400	4,406,100	1,864,350	773,150	2,637,500	559,350	1,209,250	1,768,600

1/ Price base 1974

June 1974

TABLE 3 - STRUCTURE DATA

CHANNELS

Bayou Plaquemine Brule Watershed, Louisiana

Channel	Station	Drainage Area (Sq. Mi.)	Capacity cfs Req'd	Capacity cfs Design	Water Surface Elev.	Hydraulic Gradient (ft/ft)	Channel Dimensions Bottom Width (ft)	Channel Dimensions Bottom Grade (%)	Depth of Flow (ft)	Side Slopes	"n" Value Aged	"n" Value As Built	Velocities Aged	Velocities As Built	Excavation Cu. Yds.	Inventory of Ch. Work[1/] Type of Work	Type of Ch. Prior To Proj.	Flow Cond. Prior To Proj.
M-1	2934+67	3.59	155	252	62.9	.00020	A=215	P=46			.050	.050	1.17	1.17		VI	M	E
	2750+00	5.55	323	355	59.3	.00020	A=275	P=51			.050	.050	1.29	1.29		VI	M	E
	2504+00	20.26	663	744	51.0	.00035	A=329	P=56			.040	.040	2.26	2.26		VI	M	E
	2290+00	39.19	1150	1353	43.4	.00035	A=503	P=66			.040	.040	2.69	2.69		VI	M	I
	2240+00	43.01	1241	1323	41.7	.00035	A=735	P=85			.065	.065	1.80	1.80		VI	M	I
	2160+00	46.60	1327	1323	38.9	.00035	A=735	P=85			.065	.065	1.80	1.80		VI	M	I
	2150+00	46.60	8580 2/	8580 3/	44.7	.00022	40	.024	22.4	1.5:1	.025	.0225	4.80 4/	5.03 4/		II	M	I
	2015+00	49.52	8930 2/	8930 3/	41.9	.00010	40	.024	22.9	1.5:1	.025	.0225	3.43 5/	3.81 5/	198,000	II	M	I
	1745+00	80.01	2080	2082	26.6	.00027	A=905	P=88			.050	.050	2.30	2.30		VI	M	I
	1458+00	96.32	2430	2448	18.7	.00018	A=1194	P=116			.045	.045	2.05	2.05		VI	M	I
	1285+00	122.60	2970	2975	14.5	.00030	A=1110	P=109			.045	.045	2.68	2.68		VI	M	I
	1016+00	164.68	3800	3808	11.9	.00012	A=1876	P=204			.035	.035	2.03	2.03		VI	M	Pr
	839+60	257.85	5520	5547 3/	11.0	.000025	A=11320	P=1276			.065	.065	.49	.49		VI	M	Pr
	624+16	266.00	5660	5674 3/	10.6	.000025	A=8730	P=827			.055	.055	.65	.65		VI	M	Pr
	435+00	306.50	6370	6440 3/	10.5	.0000070	A=23000	P=2310			.065	.065	.28	.28		VI	M	Pr
	0+00	366.52	7400	7480 3/	10.5	.0000015	A=37410	P=1958			.060	.060	.20	.20		VI	M	Pr

1/ See attached coding system for inventory of channel work.
2/ 100 year peak flow.
3/ Includes overbank flow.
4/ Velocities with 10-year peak flow: Aged - 4.22 ft/sec; As Built - 4.69 ft/sec.
Bottom materials encountered in drilling consisted of preconsolidated clay (CH).
Suspended sediment will be present during flows.
5/ Velocities with bankfull flow: Aged 3.08 ft/sec; As Built - 3.42 ft/sec

June 1974

(continued)
Table 3 - Structure Data Channels
Bayou Plaquemine Brule Watershed, Louisiana

Channel	Station	Drainage Area Sq. Mi.	Capacity cfs Req'd	Capacity cfs Design	Water Surface Elev.	Hydraulic Gradient (ft/ft)	Channel Dimensions Bottom Width (ft)	Channel Dimensions Bottom Grade (%)	Channel Dimensions Depth of Flow (ft)	Channel Dimensions Side Slopes	"n" Value Aged	"n" Value As Built	Velocities Aged	Velocities As Built	Excavation Cu. Yds.	Inventory of Ch. Work[1/] Type of Work	Inventory of Ch. Work[1/] Type of Ch. Prior To Proj.	Inventory of Ch. Work[1/] Flow Cond. Prior To Proj.
L-1A	255+00	0.58	34	41	12.40	.00030	A=62	P=25			.070	.045	0.67	1.04		IV	M	E
	150+00	2.76	126	126	10.60	.00007	A=279	P=133			.070	.045	0.29	0.45		IV	M	E
	0+00		Channel is within Flood Plain of M-1													VI	M	S
L-1A-1	135+00																	
	0+00	1.63	Estimated												24,300	II	M	E
L-1A-1A	27+00																	
	0+00	0.20	Estimated												4,860	II	M	E
L-1B	794+43	0.83	46	56	24.5	.00050	8	.070	3.4	1.5:1	.045	.025	1.25	2.25		II	M	E
	704+62	2.41	113	116	20.0	.00050	10	.070	4.3	1.5:1	.040	.025	1.64	2.62		II	M	E
	655+00	2.88	131	132	17.5	.00050	10	.049	4.6	1.5:1	.040	.025	1.70	2.72		II	M	E
	590+00	3.97	171	173	15.2	.00035	14	.049	5.1	1.5:1	.040	.025	1.57	2.51		II	M	E
	575+00	10.43	381	397	14.6	.00035	A=197	P=49			.035	.0225	2.02	3.14		IV	M	E
	451+00	14.84	510	510	12.0	.00020	18	.029	8.1	1.5:1	.030	.020	2.09	3.14		II	M	E
	300+00	28.30	870	879	10.5	.00010	40	.010	8.3	1.5:1	.025	.020	2.02	2.52	195,600	II	M	S
	0+00		Channel is below Hydraulic Gradient of M-1													VI	M	S
L-1C	62+00																	
	0+00	0.68	Estimated												11,160	II	N	S
L-1D	299+00	0.25	17	21	17.0	.00035	6	.081	2.5	1.5:1	.045	.025	0.86	1.55		II	M	E
	88+00	6.85	268	271	10.5	.00010	16	.022	7.9	1.5:1	.035	.0225	1.23	1.91	43,000	II	M	E
	0+00	8.37	Channel is below Hydraulic Gradient of M-1													VI	M	S
L-1D-1	68+00																	
	0+00	0.50	Estimated												12,240	II	M	E
L-1D-3	104+00																	
	0+00	1.75	Estimated												18,720	II	M	E
L-1D-4	53+00																	
	0+00	0.25	Estimated												9,540	II	M	E

1/ See attached coding system for inventory of channel work.

June 1974

(continued)
Table 3 - Structure Data Channels
Bayou Plaquemine Brule Watershed, Louisiana

Channel	Station	Drainage Area Sq. Mi.	Capacity cfs Req'd	Capacity cfs Design	Water Surface Elev.	Hydraulic Gradient (ft/ft)	Channel Dimensions Bottom Width (ft)	Channel Dimensions Bottom Grade (%)	Depth of Flow (ft)	Side Slopes	"n" Value Aged	"n" Value As Built	Velocities Aged	Velocities As Built	Excavation Cu. Yds.	Inventory of Ch. Work[1/] Type of Work	Type of Ch. Prior To Proj.	Flow Cond. Prior To Proj.
L-1E	479+00	4.91	206	229	19.4	.00035	A=159	P=38			.050	.050	1.44	1.44		VI	M	E
	365+00	18.02	604	926	16.1	.00015	A=532	P=87			.035	.035	1.74	1.74		VI	M	E
	321+21	20.17	663	1173	15.4	.00015	A=646	P=99			.035	.035	1.82	1.82		VI	M	S
	124+50	27.09	853	2433	12.5	.00015	A=1137	P=136			.035	.035	2.14	2.14		VI	M	I
	0+00	29.72	920	3119	10.6	.00015	A=1512	P=191			.035	.035	2.06	2.06		VI	M	I
L-1E-1	61+00														10,980	II	M	E
	0+00	0.50	Estimated															
L-1E-2	35+00														6,300	II	M	E
	0+00	0.62	Estimated															
L-1E-3	59+00														10,620	II	M	E
	0+00	1.52	Estimated															
L-1E-4	228+00	0.11	9	19	26.6	.00050	4	.082	2.5	1.5:1	.045	.025	0.96	1.73		II	M	E
	204+00	0.34	22	22	25.4	.00050	5	.082	2.5	1.5:1	.045	.025	0.99	1.78	900	II	M	E
	140+00	1.00	54	84	22.2	.00050	A=76	P=27			.060	.060	1.11	1.11		VI	M	E
	60+00	1.72	85	95	19.0	.00040	A=124	P=35			.060	.060	1.16	1.16		VI	M	E
	0+00	9.18	342	395	16.6	.00040	A=224	P=44			.050	.050	1.76	1.76		VI	M	E
L-1E-4A	104+00														18,720	II	M	E
	0+00	2.95	Estimated															
L-1E-4B	112+00														20,160	II	M	E
	0+00	4.01	Estimated															
L-1E-4B-1	96+00														17,280	II	M	E
	0+00	1.00	Estimated															
L-1E-5	26+00														4,680	II	M	E
	0+00	0.43	Estimated															

1/ See attached coding system for inventory of channel work.

June 1974

(continued)
Table 3 - Structure Data Channels
Bayou Plaquemine Brule Watershed, Louisiana

Channel	Station	Drainage Area Sq. Mi.	Capacity cfs Req'd	Capacity cfs Design	Water Surface Elev.	Hydraulic Gradient (ft/ft)	Channel Dimensions Bottom Width (ft)	Channel Dimensions Bottom Grade (%)	Channel Dimensions Depth of Flow (ft)	Channel Dimensions Side Slopes	"n" Value Aged	"n" Value As Built	Velocities Aged	Velocities As Built	Excavation Cu. Yds.	Inventory of Ch. Work[1/] Type of Work	Inventory of Ch. Work[1/] Type of Ch. Prior To Proj.	Inventory of Ch. Work[1/] Flow Cond. Prior To Proj.
L-1E-6	70+00	1.30	67	74	21.2	.00070	6	.070	4.0	1.5:1	.045	.025	1.54	2.77		II	M	E
	65+00	1.39	71	74	20.8	.00070	6	.070	4.0	1.5:1	.045	.025	1.54	2.77		II	M	E
	60+00	1.47	74	77	20.7	.00020	10	.020	4.4	1.5:1	.040	.025	1.05	1.68	400	II	M	E
	20+00	2.02	97	129	19.9	.00020	A=114	P=36			.040	.025	1.13	1.81		IV	M	E
	0+00	2.26	107	111	19.5	.00020	A=134	P=37			.060	.060	0.82	0.82		VI	M	E
L-1F	239+00															II	M	E
	184+00															II	M	E
	85+00															VI	M	E
	0+00	3.31	Estimated												25,200	II	M	S
L-1F-1	60+00																	
	0+00	0.10	Estimated												10,800	II	M	E
L-1F-1A	16+00																	
	0+00	0.05	Estimated												2,880	II	M	E
L-1F-2	27+00																	
	0+00	0.25	Estimated												4,860	II	M	E
L-1G	150+00																	
	0+00	1.46	Estimated												27,000	II	M	E
L-1H	198+00																	
	0+00	3.29	Estimated												36,150	II	M	E
L-1H-1	47+00																	
	0+00	0.50	Estimated												8,460	II	M	E
L-1I	1258+00	6.81	265	466	36.6	.00040	A=281	P=60			.050	.050	1.66	1.66		VI	M	E
	1148+00	13.40	469	614	32.2	.00040	A=294	P=52			.045	.045	2.09	2.09		VI	M	E
	1050+00	26.90	840	864	29.7	.00025	A=335	P=56			.030	.030	2.58	2.58		VI	M	I
	0+00		Proved adequate with Water Surface Profiles													VI	M	I
L-1I-1	129+00																	
	0+0C	2.26	Estimated												23,220	II	M	E

1/ **See attached coding system for inventory of channel work.**

(continued)
Table 3 - Strucuture Data Channels
Bayou Plaquemine Brule Watershed, Louisiana

Channel	Station	Drainage Area Sq. Mi.	Capacity cfs Req'd	Capacity cfs Design	Water Surface Elev.	Hydraulic Gradient (ft/ft)	Channel Dimensions Bottom Width (ft)	Channel Dimensions Bottom Grade (%)	Channel Dimensions Depth of Flow (ft)	Channel Dimensions Side Slopes	"n" Value Aged	"n" Value As Built	Velocities Aged	Velocities As Built	Excavation Cu. Yds.	Inventory of Ch. Work 1/ Type of Work	Inventory of Ch. Work 1/ Type of Ch. Prior To Proj.	Inventory of Ch. Work 1/ Flow Cond. Prior To Proj.
L-1I-2	64+00																	
	0+00	1.34		Estimated											11,520	II	M	E
L-1I-3	70+00																	
	0+00	0.71		Estimated											12,600	II	M	E
L-1I-4	76+00															II	M	E
	47+00															II	M	E
	0+00	1.09		Estimated											13,680	II	M	E
L-1I-5	467+41	0.23	16	20	39.2	.00010	8	.042	3.0	1.5:1	.045	.025	0.52	0.94		II	M	E
	430+00	0.60	35	35	38.6	.00010	10	.042	3.7	1.5:1	.040	.025	0.60	0.96		II	M	E
	390+00	1.59	79	88	36.0	.00070	A=56	P=24			.045	.025	1.56	2.81		IV	M	E
	245+00	4.33	182	186	34.5	.00010	12	.018	7.2	1.5:1	.035	.025	1.13	1.76	28,400	II	M	E
	211+65	4.94	206	229	33.3	.00035	A=187	P=43			.060	.060	1.23	1.23		VI	M	E
	120+00	7.01	274	298	30.1	.00035	A=211	P=44			.060	.060	1.41	1.41		VI	M	E
	0+00	9.80	361	378	23.5	.00055	A=209	P=50			.050	.050	1.81	1.81		VI	M	E
L-1I-6	402+57	0.01	1	10	46.8	.00020	6	.037	2.0	1.5:1	.045	.025	0.57	1.03		II	M	E
	292+39	0.55	33	33	44.6	.00020	8	.037	3.3	1.5:1	.045	.025	0.78	1.40		II	M	E
	159+42	1.55	78	81	41.9	.00020	8	.031	4.9	1.5:1	.040	.025	1.07	1.71		II	M	E
	120+00	2.04	97	99	41.1	.00020	9	.031	5.2	1.5:1	.040	.025	1.13	1.81	33,600	II	M	E
	0+00	3.14	140	169	26.7	.00120	A=100	P=36			.060	.060	1.70	1.70		VI	M	E

1/ See attached coding system for inventory of channel work.

June 1974

(continued)
Table 3 - Structure Data Channels
Bayou Plaquemine Brule Watershed, Louisiana

Channel	Station	Drainage Area Sq. Mi.	Capacity cfs Req'd	Capacity cfs Design	Water Surface Elev.	Hydraulic Gradient (ft/ft)	Channel Dimensions Bottom Width (ft)	Channel Dimensions Bottom Grade (%)	Channel Dimensions Depth of Flow (ft)	Channel Dimensions Side Slopes	"n" Value Aged	"n" Value As Built	Velocities Aged	Velocities As Built	Excavation Cu. Yds.	Inventory of Ch. Work[1/] Type of Work	Inventory of Ch. Work[1/] Type of Ch. Prior To Proj.	Inventory of Ch. Work[1/] Flow Cond. Prior To Proj.
L-II-7	369+23	0.29	19	20	37.0	.00015	8	.037	2.7	1.5:1	.045	.025	0.60	1.08		II	M	E
	290+21	0.98	53	54	36.7	.00015	8	.037	4.3	1.5:1	.040	.025	0.87	1.39		II	M	E
	236+50	1.99	96	98	35.9	.00015	A=99	P=31			.040	.025	0.99	1.58		IV	M	E
	150+00	2.99	133	134	34.6	.00015	12	.026	5.9	1.5:1	.040	.025	1.09	1.74	17,600	II	M	E
	35+17	4.55	190	208	30.0	.00040	A=122	P=35			.040	.025	1.71	2.74		IV	M	E
	0-0+80	6.20	247	309	28.6	.00040	A=213	P=43			.060	.060	1.45	1.45		VI	M	E
L-II-7A	76+06	0.47	29	29	35.7	.0001	8	.050	3.7	1.5:1	.045	.025	0.58	1.04		II	M	E
	46+00	0.97	52	52	35.4	.0001	8	.050	4.7	1.5:1	.040	.025	0.74	1.18	1,300	II	M	E
	20+00	1.22	64	171	31.0	.00170	A=85	P=30			.060	.060	2.02	2.02		VI	M	E
	0-0+24	1.52	77	133	30.0	.00050	A=106	P=31			.060	.060	1.26	1.26		VI	M	E
L-II-8	115+25	0.11	8	15	45.0	.00080	4	.188	2.0	1.5:1	.045	.025	1.08	1.94		II	M	E
	105+00	0.21	15	15	44.2	.00080	4	.188	2.0	1.5:1	.045	.025	1.08	1.94		II	M	E
	40+75	0.85	47	48	32.5	.00180	4	.188	2.9	1.5:1	.045	.025	1.97	3.55		II	M	E
	0+00	2.55	117	119	32.1	.00010	14	.017	5.8	1.5:1	.040	.025	0.90	1.44	17,900	II	M	E
L-II-8A	23+70	0.67	39	39	33.4	.00040	8	.146	3.0	1.5:1	.045	.025	1.05	1.89		II	M	E
	15+50	1.14	60	61	32.7	.00040	8	.038	3.8	1.5:1	.045	.025	1.18	2.12	2,100	II	M	E
	0+00	1.18	62	61	32.5	.00040	8	.038	3.8	1.5:1	.045	.025	1.18	2.12		II	M	E
L-II-8A-1	49+76	0.06	5	12	43.4	.00050	4	.090	2.0	1.5:1	.045	.025	0.86	1.55		II	M	E
	40+00	0.16	12	12	42.9	.00050	4	.090	2.0	1.5:1	.045	.025	0.86	1.55		II	M	E
	5+00	0.32	21	27	34.3	.00250	4	.266	2.0	1.5:1	.045	.025	1.91	3.44		II	M	E
	0+00	0.34	22	23	34.0	.00050	6	.060	2.4	1.5:1	.045	.025	1.00	1.80	1,800	II	M	E

1/ See attached coding system for inventory of channel work.

June 1974

(continued)
Table 3 - Structure Data Channels
Bayou Plaquemine Brule Watershed, Louisiana

Channel	Station	Drainage Area Sq. Mi.	Capacity cfs Req'd	Capacity cfs Design	Water Surface Elev.	Hydraulic Gradient (ft/ft)	Channel Dimensions Bottom Width (ft)	Channel Dimensions Bottom Grade (%)	Depth of Flow (ft)	Side Slopes	"n" Value Aged	"n" Value As Built	Velocities Aged	Velocities As Built	Excavation Cu. Yds.	Inventory of Ch. Work[1/] Type of Work	Type of Ch. Prior To Proj.	Flow Cond. Prior To Proj.
L-1I-9	66+12	5.11	210	235	34.1	.00025	8	.027	7.3	1.5:1	.035	.0225	1.70	2.64		II	M	E
	44+00	5.20	214	235	33.5	.00025	8	.027	7.3	1.5:1	.035	.0225	1.70	2.64		II	M	E
	0+00	9.25	344	372	32.4	.00025	14	.034	7.7	1.5:1	.035	.0225	1.89	2.94	11,500	II	M	E
L-1I-9A	65+00	2.35	122	122	37.1	.00070	8	.072	4.4	1.5:1	.040	.025	1.90	3.04		II	M	E
	40+00	2.65	122	122	35.3	.00070	8	.072	4.4	1.5:1	.040	.025	1.90	3.04		II	M	E
	18+00	2.91	133	135	34.6	.00030	10	.045	5.3	1.5:1	.040	.025	1.42	2.27	3,000	II	M	E
	0+00	3.68	160	230	34.1	.00030	A=124	P=31			.035	.0225	1.86	2.89		IV	M	E
L-1I-9A-1	20+23	0.44	27	39	38.1	.00220	4	.223	2.5	1.5:1	.045	.025	1.49	2.68		II	M	E
	5+00	0.51	31	39	34.7	.00220	4	.223	2.5	1.5:1	.045	.025	1.49	2.68		II	M	E
	0+00	0.52	32	32	34.6	.00020	6	.02	3.6	1.5:1	.045	.025	0.78	1.40	900	II	M	E
L-1I-10	159+46	0.05	4	13	47.3	.00060	4	.098	2.0	1.5:1	.045	.025	0.94	1.69		II	M	E
	130+00	0.38	24	25	45.5	.00060	6	.098	2.4	1.5:1	.045	.025	1.09	1.96	2,000	II	M	E
	106+00	0.65	37	48	42.4	.00130	A=36	P=21			.060	.060	1.30	1.30		VI	M	E
	50+00	1.34	69	73	36.2	.00110	A=52	P=23			.060	.060	1.42	1.42		VI	M	E
	39+11	1.41	72	79	35.0	.00110	A=46	P=23			.045	.025	1.72	3.10		IV	M	E
	15+00	3.50	154	168	33.8	.00050	A=100	P=35			.040	.025	1.67	2.67		IV	M	E
	0+00	3.56	156	166	33.0	.00050	A=132	P=38			.060	.060	1.26	1.26		VI	M	E
L-1I-10A	15+00	0.74	42	44	36.1	.00114	4	.126	3.1	1.5:1	.045	.025	1.63	2.93		II	M	E
	0+00	0.83	46	47	34.3	.00114	4	.126	3.2	1.5:1	.045	.025	1.66	2.99	700	II	M	E

1/ See attached coding system for inventory of channel work.

June 1974

(continued)
Table 3 - Structure Data Channels
Bayou Plaquemine Brule Watershed, Louisiana

Channel	Station	Drainage Area Sq. Mi.	Capacity cfs Req'd	Capacity cfs Design	Water Surface Elev.	Hydraulic Gradient (ft/ft)	Channel Dimensions Bottom Width (ft)	Bottom Grade (%)	Depth of Flow (ft)	Side Slopes	"n" Value Aged	"n" Value As Built	Velocities Aged	Velocities As Built	Excavation Cu. Yds.	Inventory of Ch. Work[1/] Type of Work	Type of Ch. Prior To Proj.	Flow Cond. Prior To Proj.
L-1I-10B	76+49	0.06	5	17	48.6	.00100	4	0.100	2.0	1.5:1	.045	.025	1.21	2.18		II	M	E
	54+00	0.32	21	22	46.4	.00100	5	0.100	2.1	1.5:1	.045	.025	1.28	2.30	400	II	M	E
	26+00	0.39	24	26	38.6	.00280	A=18	P=15			.06	.060	1.48	1.48		VI	M	E
	0+00	1.14	60	109	35.0	.00140	A=67	P=29			.06	.060	1.62	1.62		VI	M	E
L-1I-10B-1	48+57	0.03	3	13	44.6	.00060	4	.094	2.0	1.5:1	.045	.025	0.94	1.69		II	M	E
	20+00	0.32	21	23	42.9	.00060	6	.094	2.3	1.5:1	.045	.025	1.07	1.93	1,300	II	M	E
	0+00	0.55	32	53	38.3	.00230	A=30	P=17			.060	.060	1.73	1.73		VI	M	E
L-1I-11	82+82	0.32	21	20	46.4	.00120	4	.141	2.1	1.5:1	.045	.025	1.36	2.45		II	M	E
	68+00	0.41	26	27	44.7	.00120	4	.141	2.4	1.5:1	.045	.025	1.46	2.63	800	II	M	E
	0+00	1.27	66	88	36.5	.00120	A=60	P=26			.060	.060	1.49	1.49		VI	M	E
L-1I-12	44+68	0.29	19	22	43.4	.00120	A=17	P=14			.045	.025	1.29	2.32		IV	M	E
	9+00	0.52	31	32	39.2	.00120	A=23	P=17			.045	.025	1.40	2.52		IV	M	E
	0+00	0.59	34	40	38.0	.00120	A=32	P=19			.060	.060	1.22	1.22		VI	M	E
L-1J	86+00																	
	0+00	1.19		Estimated											15,480	II	M	E
L-1J-1	33+00																	
	0+00	0.25		Estimated											5,940	II	M	E
L-1K	449+80	0.03	3	8	43.8	.0001	4	.040	2.5	1.5:1	.045	.025	0.43	0.77		II	M	E
	414+50	0.22	16	16	43.4	.0001	6	.040	3.0	1.5:1	.045	.025	0.50	0.90		II	M	E
	371+95	0.51	31	31	43.0	.0001	7	.040	4.0	1.5:1	.045	.025	0.59	1.06		II	M	E
	316+26	1.04	55	57	42.5	.0001	10	.020	4.5	1.5:1	.040	.025	0.75	1.20		II	M	E
	268+46	1.36	70		42.0	.0001	11	.020	4.9	1.5:1	.040	.025	0.80	1.28		II	M	E
	260+00	1.70	84	84	41.9	.0001	13	.020	5.0	1.5:1	.040	.025	0.82	1.31		II	M	E
	195+96	2.31	108	198	38.2	.00055	13	.055	5.0	1.5:1	.040	.025	1.93	3.09		II	M	E
	115+00	3.90	168	198	33.9	.00055	13	.055	5.0	1.5:1	.040	.025	1.93	3.09		II	M	E
	50+00	5.70	229	245	30.3	.00055	A=125	P=37			.040	.025	1.97	3.15		IV	M	E
	0+00	6.26	247	252	29.0	.00025	16	.026	6.0	1.5:1	.035	.0225	1.68	2.61	94,000	II	M	E
	Equation 0+00 L.A.=456+36 L.B.																	
	456+36	6.26	247	603	29.0	.00035	A=222	P=44			.030	.025	2.72	3.26		IV	M	E
	357+50	13.19	461	1570	25.5	.00035	A=466	P=67			.030	.025	3.37	4.04		IV	M	E
	250+00	27.50	860	988	21.8	.00035	A=653	P=111			.060	.060	1.51	1.51		VI	M	I
	0+00	34.69	1040	2321	13.0	.00035	A=1224	P=148			.060	.060	1.90	1.90		VI	M	I

1/ See attached coding system for inventory of channel work.

June 1974

(continued)
Table 3 - Structure Data Channels
Bayou Plaquemine Brule Watershed, Louisiana

Channel	Station	Drainage Area Sq. Mi.	Capacity cfs Req'd	Capacity cfs Design	Water Surface Elev.	Hydraulic Gradient (ft/ft)	Channel Dimensions Bottom Width (ft)	Channel Dimensions Bottom Grade (%)	Channel Dimensions Depth of Flow (ft)	Channel Dimensions Side Slopes	"n" Value Aged	"n" Value As Built	Velocities Aged	Velocities As Built	Excavation Cu. Yds.	Inventory of Ch. Work[1/] Type of Work	Inventory of Ch. Work[1/] Type of Ch. Prior To Proj.	Inventory of Ch. Work[1/] Flow Cond. Prior To Proj.
L-1K-1	105+00																	
	0+00	3.52		Estimated											18,900	II	M	E
L-1K-1A	44+00																	
	0+00	0.75		Estimated											7,920	II	M	E
L-1K-2	42+00																	
	0+00	0.88		Estimated											7,560	II	M	E
L-1K-3	33+00																	
	0+00	0.39		Estimated											5,940	II	M	E

1/ See attached coding system for inventory of channel work.

June 1974

(continued)
Table 3 - Structure Data Channels
Bayou Plaquemine Brule Watershed, Louisiana

Channel	Station	Drainage Area Sq. Mi.	Capacity cfs Req'd	Capacity cfs Design	Water Surface Elev.	Hydraulic Gradient (ft/ft)	Channel Dimensions Bottom Width (ft)	Channel Dimensions Bottom Grade (%)	Channel Dimensions Depth of Flow (ft)	Channel Dimensions Side Slopes	"n" Value Aged	"n" Value As Built	Velocities Aged	Velocities As Built	Excavation Cu. Yds.	Inventory of Ch. Work[1/] Type of Work	Inventory of Ch. Work[1/] Type of Ch. Prior To Proj.	Inventory of Ch. Work[1/] Flow Cond. Prior To Proj.
L-1K-4	449+40	0.30	20	20	43.1	.00015	8	.026	2.7	1.5:1	.045	.025	0.61	1.10		II	M	E
	310+00	1.20	63	64	41.1	.00015	10	.026	4.3	1.5:1	.040	.025	0.90	1.44		II	M	E
	220+00	2.80	127 -	127	36.1	.00055	10	.056	4.4	1.5:1	.040	.025	1.74	2.78		II	M	E
	37+72	7.27	280	282	26.1	.00055	A=149	P=46			.040	.025	1.90	3.04		IV	M	E
	35+00	10.76	416	935	26.1	.00010	A=448	P=68			.025	.020	2.08	2.60		IV	M	E
	0+00	11.57	416	418	25.7	.00010	16	.011	9.1	1.5:1	.030	.020	1.55	2.32	36,200	II	M	E
L-1K-4A	39+00																	
	0+00	0.54		Estimated											7,020	II	M	E
L-1K-4B	158+98	0.38	24	22	38.0	.00025	4	.064	3.2	1.5:1	.045	.025	0.78	1.40		II	M	E
	145+00	0.59	34	36	37.6	.00025	6	.064	3.6	1.5:1	.045	.025	0.87	1.57		II	M	E
	95+00	1.19	62	65	31.1	.00130	6	.122	3.2	1.5:1	.045	.025	1.87	3.37		II	M	E
	80+00	1.33	68	69	30.3	.00050	8	.133	3.8	1.5:1	.045	.025	1.32	2.38	5,300	II	M	E
	48+44	2.54	117	123	29.2	.00050	A=111	P=39			.060	.060	1.12	1.12		VI	M	E
	0+00	3.49	153	162	26.8	.00050	A=134	P=41			.060	.060	1.22	1.22		VI	M	E
L-1K-4B-1	30+00																	
	0+00	0.61		Estimated											5,400	II	M	E
L-1K-4B-2	52+00																	
	0+00	0.83		Estimated											9,360	II	M	E
L-1K-4B-3	44+60	0.09	7	13	39.1	.00025	4	.054	2.5	1.5:1	.045	.025	0.68	1.22		II	M	E
	0+00	0.38	24	22	38.0	.00025	4	.054	3.2	1.5:1	.045	.025	0.78	1.40	6,000	II	M	E
L-1K-4C	49+00																	
	0+00	0.39		Estimated											8,820	II	M	E
L-1K-4D	37+76	0.06	5	19	35.5	.0012	4	.119	2.0	1.5:1	.045	.025	1.33	2.39		II	M	E
	0+00	0.23	10	19	31.0	.0012	4	.119	2.0	1.5:1	.045	.025	1.33	2.39	2,000	II	M	E
L-1K-4E	54+42	0.68	39	38	36.7	.00100	6	.108	2.6	1.5:1	.045	.025	1.47	2.65		II	M	E
	35+00	0.73	42	44	34.8	.00100	6	.108	2.8	1.5:1	.045	.025	1.53	2.75	600	II	M	E
	0+00	0.84	47	54	31.3	.00100	A=43	P=21			.060	.060	1.26	1.26		VI	M	E

1/ See attached coding system for inventory of channel work.

(continued)
Table 3 - Structure Data Channels
Bayou Plaquemine Brule Watershed, Louisiana

Channel	Station	Drainage Area Sq. Mi.	Capacity cfs Req'd	Capacity cfs Design	Water Surface Elev.	Hydraulic Gradient (ft/ft)	Channel Dimensions Bottom Width (ft)	Channel Dimensions Bottom Grade (%)	Channel Dimensions Depth of Flow (ft)	Channel Dimensions Side Slopes	"n" Value Aged	"n" Value As Built	Velocities Aged	Velocities As Built	Excavation Cu. Yds.	Inventory of Ch. Work[1/] Type of Work	Inventory of Ch. Work[1/] Type of Ch. Prior To Proj.	Inventory of Ch. Work[1/] Flow Cond. Prior To Proj.
L-1K-5	238+37	0.88	49	51	42.3	.00060	8	.075	3.1	1.5:1	.045	.025	1.30	2.34		II	M	E
	205+00	1.22	64	64	40.3	.00060	8	.075	3.5	1.5:1	.045	.025	1.39	2.50		II	M	E
	150+00	1.89	92	92	37.0	.00060	A=68	P=31			.045	.025	1.35	2.43		IV	M	E
	135+00	2.08	99	103	36.1	.00060	8	.060	4.2	1.5:1	.040	.025	1.72	2.75		II	M	E
	115+00	2.35	109	110	35.4	.00035	10	.045	4.6	1.5:1	.040	.025	1.42	2.27	7,000	II	M	E
	75+00	3.73	162	188	34.0	.00035	A=123	P=38			.040	.025	1.53	2.45		IV	M	E
	35+00	4.15	177	214	30.4	.00090	A=144	P=50			.060	.060	1.49	1.49		VI	M	E
	0+00	5.70	230	288	28.0	.00070	A=155	P=43			.050	.060	1.86	1.86		VI	M	E
L-1K-5A	92+00																	
	0+00	1.01		Estimated											16,560	II	M	E
L-1K-5B	49+00																	
	0+00	0.92		Estimated											8,820	II	M	E
L-1K-5B-1	23+00																	
	0+00	0.20		Estimated											4,140	II	M	E
L-1K-6	78+00																	
	0+00	0.54		Estimated											14,040	II	M	E
L-1K-7	86+00																	
	0+00	0.95		Estimated											15,480	II	M	E
L-1L	364+47	0.01	1	16	39.2	.00090	4	.104	2.0	1.5:1	.045	.025	1.15	2.07		II	M	E
	330+00	0.27	18	18	36.1	.00090	4	.104	2.1	1.5:1	.045	.025	1.18	2.12		II	M	E
	264+00	1.27	66	67	35.1	.00015	8	.065	4.8	1.5:1	.040	.025	0.92	1.47		II	M	E
	160+00	2.90	131	147	25.2	.00095	A=98	P=35			.060	.060	1.51	1.51		VI	M	E
	120+00	3.30	146	178	21.4	.00095	A=78	P=28			.040	.025	2.28	3.65		IV	M	E
	99+00	3.45	151	154	19.4	.00095	6	.114	5.0	1.5:1	.040	.025	2.28	3.65		II	M	E
	74+00	4.43	187	193	18.5	.00035	10	.176	6.1	1.5:1	.040	.025	1.65	2.64		II	M	E
	0+00	20.27	659	668	15.9	.00035	14	.044	8.8	1.5:1	.030	.020	2.79	4.18	29,000	II	M	I
L-1L-1	381+00	0.01	1	9	40.0	.00030	4	.075	2.0	1.5:1	.045	.025	0.66	1.19		II	M	E
	289+00	0.80	44	44	36.4	.00030	6	.075	3.8	1.5:1	.045	.025	0.98	1.76		II	M	E
	230+00	1.52	77	78	31.6	.00070	6	.075	4.1	1.5:1	.045	.025	1.57	2.83		II	M	E
	185+00	2.00	96	127	28.5	.00070	A=70	P=28			.040	.025	1.81	2.90		IV	M	E
	115+00	3.15	140	164	24.3	.00060	A=131	P=44			.060	.060	1.25	1.25		VI	M	E
	50+00	3.86	166	197	20.4	.00060	A=135	P=55			.045	.025	1.46	2.63		IV	M	E
	15+00	4.25	180	183	18.3	.00060	10	.068	5.2	1.5:1	.040	.025	1.98	3.17	15,600	II	M	E
	0+00	4.41	186	234	17.4	.00060	A=301	P=207			.060	.060	0.78	0.78		VI	M	E

1/ See attached coding system for inventory of channel work.

June 1974

(continued)
Table 3 - Structure Data Channels
Bayou Plaquemine Brule Watershed, Louisiana

Channel	Station	Drainage Area Sq. Mi.	Capacity cfs Req'd	Capacity cfs Design	Water Surface Elev.	Hydraulic Gradient (ft/ft)	Channel Dimensions Bottom Width (ft)	Channel Dimensions Bottom Grade (%)	Channel Dimensions Depth of Flow (ft)	Channel Dimensions Side Slopes	"n" Value Aged	"n" Value As Built	Velocities Aged	Velocities As Built	Excavation Cu. Yds.	Inventory of Ch. Work[1/] Type of Work	Inventory of Ch. Work[1/] Type of Ch. Prior To Proj.	Inventory of Ch. Work[1/] Flow Cond. Prior To Proj.
L-1L-2	395+00	0.67	39	52	41.0	.00075	A=36	P=18			.045	.025	1.44	2.59		IV	M	E
	385+00	0.78	44	52	40.2	.00075	A=36	P=18			.045	.025	1.44	2.59		IV	M	E
	295+00	2.11	100	105	33.4	.00075	8	.091	4.0	1.5:1	.040	.025	1.87	2.99		II	M	E
	215+00	4.80	190	199	29.3	.00050	12	.058	5.3		.040	.025	1.88	3.01		II	M	E
	0+00	10.98	395	400	18.6	.00050	14	.058	6.7	1.5:1	.035	.0225	2.48	3.86	82,100	II	M	E
L-1L-2A	31+00																	
	0+00	0.78		Estimated											5,580	II	M	E
L-1L-2B	29+00																	
	0+00	0.49		Estimated											5,220	II	M	E
L-1L-2C	36+00																	
	0+00	0.38		Estimated											6,480	II	M	E
L-1L-2D	52+00																	
	0+00	0.79		Estimated											9,360	II	M	E
L-1L-2E	61+00																	
	0+00	0.89		Estimated											10,980	II	M	E
L-1M	44+00																	
	0+00	0.68		Estimated											7,920	II	M	E
L-1N	91+00																	
	0+00	1.72		Estimated											16,380	II	M	E
L-1Ø	73+00																	
	0+00	0.75		Estimated											13,140	II	M	E

1/ See attached coding system for inventory of channel work.

June 1974

(continued)
Table 3 - Structure Data Channels
Bayou Plaquemine Brule Watershed, Louisiana

Channel	Station	Drainage Area Sq. Mi.	Capacity cfs Req'd	Capacity cfs Design	Water Surface Elev.	Hydraulic Gradient (ft/ft)	Channel Dimensions Bottom Width (ft)	Bottom Grade (%)	Depth of Flow (ft)	Side Slopes	"n" Value Aged	"n" Value As Built	Velocities Aged	Velocities As Built	Excavation Cu. Yds.	Inventory of Ch. Work[1/] Type of Work	Type of Ch. Prior To Proj.	Flow Cond. Prior To Proj.
L-1P	93+00	0.19	13	23	41.5	.00180	4	.180	2.0	1.5:1	.045	.025	1.63	2.93		II	M	E
	80+00	0.24	16	23	39.2	.00180	4	.180	2.0	1.5:1	.045	.025	1.63	2.93	800	II	M	E
	46+00	0.84	46	256	33.1	.00180	A=122	P=43			.060	.060	2.10	2.10		VI	M	E
	0+00	1.26	65	500	27.2	.00130	A=251	P=76			.060	.060	1.99	1.99		VI	M	E
L-1P-1	20+41	0.08	7	21	40.4	.00150	4	.124	2.0	1.5:1	.045	.025	1.48	2.66		II	M	E
	11+54	0.11	8	21	39.0	.00150	4	.124	2.0	1.5:1	.045	.025	1.48	2.66	900	II	M	E
	0+00	0.15	11	20	37.3	.00150	A=23	P=26			.060	.060	0.89	0.89		VI	M	E
L-1R	787+40	0.45	27	44	53.6	.00050	8	.057	3.0	1.5:1	.045	.025	1.17	2.11		II	M	E
	620+00	1.75	86	86	45.1	.00050	8	.057	4.0	1.5:1	.040	.025	1.53	2.45		II	M	E
	515+00	2.42	113	114	42.6	.00025	10	.036	5.1	1.5:1	.040	.025	1.27	2.03		II	M	E
	Equation 515+00 L.A. = 338+70 L.B.																	
	185+00	5.06	209	196	34.1	.00055	10	.058	5.5	1.5:1	.040	.025	1.95	3.12		II	M	E
	122+00	8.22	342	347	31.2	.00050	10	.065	7.0	1.5:1	.035	.0225	2.42	3.76		II	M	E
	50+00	14.10	490	498	28.7	.00035	14	.044	8.2	1.5:1	.035	.0225	2.31	3.59	130,500	II	M	E
	0+00	14.58	505	523	26.9	.00035	A=353	P=62			.060	.060	1.48	1.48		VI	M	E
L-1R-1	117+40	0.23	16	24	41.0	.00080	4	.105	2.5	1.5:1	.045	.025	1.22	2.20		II	M	E
	95+47	0.49	30	31	39.3	.00080	6	.105	2.5	1.5:1	.045	.025	1.29	2.32		II	M	E
	15+00	1.98	96	108	32.8	.00080	8	.091	4.0	1.5:1	.040	.025	1.93	3.09	9,000	II	M	E
	0+00	2.14	102	108	31.6	.00080	A=69	P=27			.050	.050	1.57	1.57		VI	M	E

1/ See attached coding system for inventory of channel work.

June 1974

(continued)
Table 3 - Structure Data Channels
Bayou Plaquemine Brule Watershed, Louisiana

Channel	Station	Drainage Area Sq. Mi.	Capacity cfs Req'd	Capacity cfs Design	Water Surface Elev.	Hydraulic Gradient (ft/ft)	Channel Dimensions: Bottom Width (ft)	Channel Dimensions: Bottom Grade (%)	Channel Dimensions: Depth of Flow (ft)	Channel Dimensions: Side Slopes	"n" Value Aged	"n" Value As Built	Velocities Aged	Velocities As Built	Excavation Cu. Yds.	Inventory of Ch. Work 1/: Type of Work	Inventory of Ch. Work 1/: Type of Ch. Prior To Proj.	Inventory of Ch. Work 1/: Flow Cond. Prior To Proj.
L-1R-2	148+45	0.16	12	13	43.2	.00065	4	.082	2.0	1.5:1	.045	.025	0.90	1.62		II	M	E
	105+00	0.70	40	42	40.8	.00055	6	.082	3.2	1.5:1	.045	.025	1.22	2.20	1,100	II	M	E
	75+00	1.06	57	77	39.1	.00055	A=63	P=32			.045	.025	1.23	2.21		IV	M	E
	70+00	1.11	59	147	38.6	.00100	A=83	P=38			.045	.025	1.77	3.19		IV	M	E
	0+00	2.93	132	143	31.6	.00100	A=92	P=33			.060	.060	1.55	1.55		VI	M	E
L-1R-3	143+80	0.03	3	23	46.4	.00100	6	.118	2.0	1.5:1	.045	.025	1.28	2.30		II	M	E
	74+89	0.80	45	48	39.5	.00100	6	.118	2.6	1.5:1	.045	.025	1.54	2.77		II	M	E
	40+88	1.19	62	79	36.1	.00100	8	.123	3.4	1.5:1	.045	.025	1.77	3.19		II	M	E
	30+00	1.73	85	94	35.0	.00100	10	.101	3.4	1.5:1	.045	.025	1.83	3.29		II	M	E
	0+00	2.23	105	106	34.0	.00035	10	.053	4.5	1.5:1	.040	.025	1.40	2.24	10,300	II	M	E
L-1R-4	26+66	0.10	7	22	39.4	.00170	4	.170	2.0	1.5:1	.045	.025	1.58	2.84		II	M	E
	0+00	0.33	21	22	34.4	.00170	4	.170	2.0	1.5:1	.045	.025	1.58	2.84	900	II	M	E
L-1R-5	449+80	0.16	12	12	43.8	.00010	6	.041	2.6	1.5:1	.045	.025	0.46	0.83		II	M	E
	515+00	0.60	35	38	43.1	.00010	6	.041	4.4	1.5:1	.040	.025	0.69	1.10	7,000	II	M	E
L-1S	44+50	0.05	4	46	44.8	.00420	0	.419	2.0	4.0:1	.045	.030	2.37	3.56		II	M	E
	24+00	0.13	10	46	36.2	.00420	0	.419	2.0	4.0:1	.045	.030	2.37	3.56	5,000	II	M	E
	0+00	0.39	25	242	30.9	.00220	A=145	P=85			.060	.060	1.66	1.66		VI	M	E
L-1U	86+32	0.16	12	23	46.5	.00180	4	.206	2.0	1.5:1	.045	.025	1.63	2.93		II	M	E
	50+00	0.53	32	33	40.0	.00180	4	.206	2.4	1.5:1	.045	.025	1.79	3.22	1,300	II	M	E
	0+00	1.06	57	114	31.0	.00180	A=71	P=38			.060	.060	1.60	1.60		VI	M	E
L-1V	47+50	0.03	3	5	44.2	.00010	4	.065	2.0	1.5:1	.045	.025	0.38	0.68		II	M	E
	20+00	0.16	12	11	43.9	.00010	4	.065	2.8	1.5:1	.045	.025	0.46	0.83	1,800	II	M	E
	0+00	0.21	15	107	31.9	.00600	A=55	P=53			.060	.060	1.97	1.97		VI	M	E

1/ See attached coding system for inventory of channel work.

June 1974

(continued)
Table 3 - Structure Data Channels
Bayou Plaquemine Brule Watershed, Louisiana

Channel	Station	Drainage Area Sq. Mi.	Capacity cfs Req'd	Capacity cfs Design	Water Surface Elev.	Hydraulic Gradient (ft/ft)	Channel Dimensions: Bottom Width (ft)	Channel Dimensions: Bottom Grade (%)	Channel Dimensions: Depth of Flow (ft)	Channel Dimensions: Side Slopes	"n" Value Aged	"n" Value As Built	Velocities Aged	Velocities As Built	Excavation Cu. Yds.	Inventory of Ch. Work 1/: Type of Work	Inventory of Ch. Work 1/: Type of Ch. Prior To Proj.	Inventory of Ch. Work 1/: Flow Cond. Prior To Proj.
L-1W	263+59	0.73	43	52	51.1	.00055	A=51	P=33			.045	.025	1.03	1.85		IV	M	E
	230+00	0.95	52	61	49.1	.00055	A=55	P=31			.045	.025	1.12	1.84		IV	M	E
	208+15	1.65	82	122	47.9	.00055	A=109	P=41			.060	.060	1.12	1.12		VI	M	E
	110+30	2.63	121	209	38.1	.00100	A=116	P=33			.060	.060	1.81	1.81		VI	M	E
	100+00	2.71	124	133	37.1	.00100	A=71	P=29			.045	.025	1.88	3.38		IV	M	E
	84+50	4.72	218	219	36.4	.00040	12	.053	5.9	1.5:1	.040	.025	1.77	2.83		II	M	E
	65+00	10.42	422	433	35.7	.00040	24	.036	6.0	1.5:1	.035	.0225	2.19	3.41	5,400	II	M	E
	20+00	13.16	463	616	33.9	.00040	A=253	P=52			.035	.0225	2.43	3.78		IV	M	I
	0+00	13.39	469	536	33.1	.00040	A=363	P=70			.060	.060	1.48	1.48		VI	M	I
L-1W-1	164+50	0.04	4	33	51.0	.00100	6	.101	2.4	1.5:1	.045	.025	1.41	2.54		II	M	E
	125+00	0.29	19	33	47.0	.00100	6	.101	2.4	1.5:1	.045	.025	1.41	2.54	5,100	II	M	E
	78+35	1.58	96	106	42.2	.00100	A=68	P=24			.060	.060	1.56	1.56		VI	M	E
	52+00	1.81	96	124	39.9	.00085	A=85	P=29			.060	.060	1.47	1.47		VI	M	E
	0+00	2.25	106	175	35.5	.00085	A=79	P=27			.040	.025	2.22	3.55		IV	M	E
L-1W-1B	76+50	0.03	3	13	50.3	.00070	4	.070	1.9	1.5:1	.045	.025	0.99	1.78		II	M	E
	50+00	0.16	12	13	48.5	.00070	4	.090	1.9	1.5:1	.045	.025	0.99	1.78		II	M	E
	0+00	0.38	24	26	45.0	.00070	4	.080	2.7	1.5:1	.045	.025	1.19	2.14	1,700	II	M	E
L-1W-2	161+69	0.20	14	14	50.2	.00090	6	0.140	1.6	1.5:1	.045	.025	1.09	1.96		II	M	E
	140+00	0.48	29	31	48.2	.00090	6	0.140	2.4	1.5:1	.045	.025	1.34	2.41	2,400	II	M	E
	50+00	2.77	126	132	40.2	.00090	A=83	P=28			.040	.025	2.32	3.70		IV	M	E
	0+00	5.55	225	278	36.4	.00075	A=155	P=45			.040	.025	2.33	3.71		IV	M	E
L-1W-2A	131+65	0.03	3	19	43.0	.00015	6	.022	3.0	1.5:1	.045	.025	0.62	1.12		II	M	E
	100+00	0.26	18	19	42.3	.00015	6	.022	3.0	1.5:1	.045	.025	0.62	1.12		II	M	E
	10+00	1.76	86	88	41.0	.00015	10	.042	5.1	1.5:1	.040	.025	0.98	1.57	15,500	II	M	E
	0+00	1.87	91	136	40.8	.00015	A=142	P=46			.040	.025	0.96	1.53		IV	M	E

1/ See attached coding system for inventory of channel work.

June 1974

(continued)
Table 3 - Structure Data Channels
Bayou Plaquemine Brule Watershed, Louisiana

Channel	Station	Drainage Area Sq. Mi.	Capacity cfs Req'd	Capacity cfs Design	Water Surface Elev.	Hydraulic Gradient (ft/ft)	Channel Dimensions Bottom Width (ft)	Channel Dimensions Bottom Grade (%)	Channel Dimensions Depth of Flow (ft)	Channel Dimensions Side Slopes	"n" Value Aged	"n" Value As Built	Velocities Aged	Velocities As Built	Excavation Cu. Yds.	Inventory of Ch. Work[1/] Type of Work	Inventory of Ch. Work[1/] Type of Ch. Prior To Proj.	Inventory of Ch. Work[1/] Flow Cond Prior To Proj.
L-1W-2A-1	15+00	0.09	8	9	43.9	.00025	4	.053	2.0	1.5:1	.045	.025	0.61	1.10		II	M	E
	0+00	0.16	12	12	43.5	.00025	4	.053	2.4	1.5:1	.045	.025	0.67	1.21	1,000	II	M	E
L-1W-2B	52+54	0.19	13	13	52.7	.00090	4	0.126	1.8	1.5:1	.045	.025	1.09	1.96		II	M	E
	0+00	0.77	42	47	48.0	.00090	4	0.126	3.4	1.5:1	.045	.025	1.09	1.96	3,400	II	M	E
L-1W-5	46+86	0.12	9	25	53.3	.00060	6	0.060	2.4	1.5:1	.045	.025	1.10	1.98		II	M	E
	13+35	0.42	25	25	51.3	.00060	6	0.060	2.4	1.5:1	.045	.025	1.10	1.98	1,800	II	M	E
	0+00	0.55	33	52	50.5	.00060	A=51	P=23			.060	.060	1.03	1.03		VI	M	E
L-1W-5A	13+30	0.06	5	7	53.2	.00130	4	0.158	1.2	1.5:1	.045	.025	1.06	1.91		II	M	E
	0+00	0.09	7	10	51.5	.00130	4	0.158	1.4	1.5:1	.045	.025	1.14	2.05	1,000	II	M	E
L-1Y	104+80	0.49	32	34	48.2	.00080	6	.095	2.6	1.5:1	.045	.025	1.31	2.36		II	M	E
	41+64	1.15	60	60	43.1	.00080	6	.095	3.5	1.5:1	.045	.025	1.53	2.75	3,700	II	M	E
	0+00	2.75	126	129	39.8	.00080	A=106	P=46			.060	.060	1.22	1.22		VI	M	E
L-1Y-1	145+00	0.26	17	20	50.6	.00010	8	.029	3.0	1.5:1	.045	.025	0.52	0.94		II	M	E
	49+90	0.78	44	44	48.8	.00010	8	.029	4.3	1.5:1	.040	.025	0.71	1.14		II	M	E
	40+00	0.82	46	86	47.3	.00150	8	.061	3.2	1.5:1	.045	.025	2.10	3.78	17,900	II	M	E
	0+00	0.96	52	98	41.4	.00150	A=61	P=28			.060	.060	1.60	1.60		VI	M	E
L-1Z	94+00																	
	0+00	2.00		Estimated											16,920	II	M	E

1/ See attached coding system for inventory of channel work.

June 1974

(continued)
Table 3 - Structure Data Channels
Bayou Plaquemine Brule Watershed, Louisiana

Channel	Station	Drainage Area Sq. Mi.	Capacity cfs Req'd	Capacity cfs Design	Water Surface Elev.	Hydraulic Gradient (ft/ft)	Channel Dimensions Bottom Width (ft)	Channel Dimensions Bottom Grade (%)	Channel Dimensions Depth of Flow (ft)	Channel Dimensions Side Slopes	"n" Value Aged	"n" Value As Built	Velocities Aged	Velocities As Built	Excavation Cu. Yds.	Inventory of Ch. Work[1/] Type of Work	Inventory of Ch. Work[1/] Type of Ch. Prior To Proj.	Inventory of Ch. Work[1/] Flow Cond. Prior To Proj.
1-1Z-1	31+00																	
	0+00	0.50	Estimated												5,580	II	M	E
L-1Z-2	33+00																	
	0+00	0.25	Estimated												5,940	II	M	E
L-1Z-3	23+00																	
	0+00	0.20	Estimated												4,140	II	M	E
L-1Z-5	18+00																	
	0+00	0.10	Estimated												3,240	II	M	E
L-1Z-6	18+00																	
	0+00	0.25	Estimated												3,240	II	M	E
L-1AA	171+20	1.48	75	356	52.5	.00040	A=315	P=56			.070	.070	1.13	1.13		VI	M	E
	0+00	4.50	189	252	45.6	.00040	A=221	P=50			.070	.070	1.14	1.14		VI	M	E
L-1AA-1	26+00																	
	0+00	0.12	Estimated												4,680	II	M	E
L-1AA-2	21+00																	
	0+00	0.11	Estimated												3,780	II	M	E
L-1AA-3	27+00																	
	0+00	0.14	Estimated												4,860	II	M	E

1/ See attached coding system for inventory of channel work.

June 1974

(continued)
Table 3 - Strucuture Data Channels
Bayou Plaquemine Brule Watershed, Louisiana

Channel	Station	Drainage Area Sq. Mi.	Capacity cfs Req'd	Capacity cfs Design	Water Surface Elev.	Hydraulic Gradient (ft/ft)	Channel Dimensions Bottom Width (ft)	Channel Dimensions Bottom Grade (%)	Channel Dimensions Depth of Flow (ft)	Channel Dimensions Side Slopes	"n" Value Aged	"n" Value As Built	Velocities Aged	Velocities As Built	Excavation Cu. Yds.	Inventory of Ch. Work[1/] Type of Work	Inventory of Ch. Work[1/] Type of Ch Prior To Proj.	Inventory of Ch. Work[1/] Flow Cond. Prior To Proj.
L-1AA-4	9+00																	
	0+00	0.33	Estimated												1,620	II	M	E
L-1AA-5	39+00																	
	0+00	0.66	Estimated												7,020	II	M	E
L-1AA-5A	18+00																	
	0+00	0.06	Estimated												3,240	II	M	E
L-1AA-6	26+00																	
	0+00	0.09	Estimated												4,680	II	M	E
L-1AA-7	47+00																	
	0+00	0.08	Estimated												8,460	II	M	E
L-1AA-8	38+00																	
	0+00	0.36	Estimated												6,840	II	M	E

1/ See attached coding system for inventory of channel work.

June 1974

(continued)
Table 3 - Structure Data Channels
Bayou Plaquemine Brule Watershed, Louisiana

Channel	Station	Drainage Area Sq. Mi.	Capacity cfs Req'd	Capacity cfs Design	Water Surface Elev.	Hydraulic Gradient (ft/ft)	Channel Dimensions Bottom Width (ft)	Bottom Grade (%)	Depth of Flow (ft)	Side Slopes	"n" Value Aged	"n" Value As Built	Velocities Aged	Velocities As Built	Excavation Cu. Yds.	Inventory of Ch. Work[1/] Type of Work	Type of Ch. Prior To Proj.	Flow Cond Prior To Proj.
L-1BB	55+00	5.71	247	255	48.1	.00020	A=222	P=49		1.5:1	.050	.050	1.15	1.15		VI	M	E
	0+00	6.08	242	327	47.0	.00020	A=259	P=49			.050	.050	1.26	1.26		VI	M	E
L-1BB-1	242+00																	
	0+00	3.83	Estimated												43,560	II	M	E
L-1BB-1A	31+00																	
	0+00	0.25	Estimated												5,580	II	M	E
L-1BB-1A-1	16+00																	
	0+00	0.10	Estimated												2,880	II	M	E
L-1CC	29+00																	
	0+00	0.22	Estimated												5,220	II	M	E
L-1DD	122+00															II	M	E
	31+00														16,380	II	M	E
	0+00	1.44	Estimated													VI	M	E
L-1DD-1	43+00																	
	0+00	0.25	Estimated												7,740	II	M	E
L-1EE	27+00																	
	0+00	0.10	Estimated												4,860	II	M	E
L-1FF	62+00																	
	0+00	0.90	Estimated												11,160	II	M	E
L-1FF-1	25+00																	
	0+00	0.40	Estimated												4,500	II	M	E

1/ See attached coding system for inventory of channel work.

June 1974

(continued)
Table 3 - Structure Data Channels
Bayou Plaquemine Brule Watershed, Louisiana

Channel	Station	Drainage Area Sq. Mi.	Capacity cfs Req'd	Capacity cfs Design	Water Surface Elev.	Hydraulic Gradient (ft/ft)	Channel Dimensions Bottom Width (ft)	Channel Dimensions Bottom Grade (%)	Channel Dimensions Depth of Flow (ft)	Channel Dimensions Side Slopes	"n" Value Aged	"n" Value As Built	Velocities Aged	Velocities As Built	Excavation Cu. Yds.	Inventory of Ch. Work[1/] Type of Work	Inventory of Ch. Work[1/] Type of Ch. Prior To Proj.	Inventory of Ch. Work[1/] Flow Cond. Prior To Proj.
L-1FF-2	11+00																	
	0+00	0.04	Estimated												1,980	II	M	E
L-1FF-3	8+00																	
	0+00	0.04	Estimated												1,440	II	M	E
L-1GG	24+00																	
	0+00	0.31	Estimated												4,320	II	M	E
L-1HH	193+00																	
	0+00	2.51	Estimated												37,249	II	M	E
L-1HH-1	40+00																	
	0+00	0.20	Estimated												7,200	II	M	E
L-1HH-2	18+00																	
	0+00	0.15	Estimated												3,240	II	M	E
L-1II	77+00																	
	0+00	1.04	Estimated												13,860	II	M	E
L-1II-1	33+00																	
	0+00	0.25	Estimated												5,940	II	M	E
L-1JJ	86+00																	
	0+00	1.04	Estimated												15,480	II	M	E

1/ See attached coding system for inventory of channel work.

June 1974

(continued)
Table 3 - Structure Data Channels
Bayou Plaquemine Brule Watershed, Louisiana

Channel	Station	Drainage Area (Sq. Mi.)	Capacity cfs Req'd	Capacity cfs Design	Water Surface Elev.	Hydraulic Gradient (ft/ft)	Channel Dimensions Bottom Width (ft)	Channel Dimensions Bottom Grade (%)	Channel Dimensions Depth of Flow (ft)	Channel Dimensions Side Slopes	"n" Value Aged	"n" Value As Built	Velocities Aged	Velocities As Built	Excavation (Cu. Yds.)	Inventory of Ch. Work[1/] Type of Work	Inventory of Ch. Work[1/] Type of Ch. Prior To Proj.	Inventory of Ch. Work[1/] Flow Cond Prior To Proj.
L-1JJ-1	24+00																	
	0+00	0.15	Estimated												4,320	II	M	E
L-1KK	39+00																	
	0+00	0.52	Estimated												7,020	II	M	E
L-1KK-1	13+00																	
	0+00	0.09	Estimated												2,340	II	M	E
L-1KK-2	15+00																	
	0+00	1.20	Estimated												2,700	II	M	E
L-1LL	20+00																	
	0+00	0.16	Estimated												3,600	II	M	E
L-1MM	19+00																	
	0+00	0.09	Estimated												3,420	II	M	E
L-1NN	250+00	0.08	7	17	70.8	.00040	4	0.040	2.5	1.5:1	.045	.025	0.86	1.55		II	M	E
	230+00	0.18	13	17	70.0	.00040	4	0.040	2.5	1.5:1	.045	.025	0.86	1.55	1,300	II	M	E
	97+20	0.89	49	164	64.7	.00040	A=135	P=35			.060	.060	1.21	1.21		VI	M	E
	0+00	1.70	84	187	56.9	.00080	A=118	P=35			.060	.060	1.58	1.58		VI	M	E

1/ See attached coding system for inventory of channel work.

June 1974

(continued)
Table 3 - Structure Data Channels
Bayou Plaquemine Brule Watershed, Louisiana

Channel	Station	Drainage Area Sq. Mi.	Capacity cfs Req'd	Capacity cfs Design	Water Surface Elev.	Hydraulic Gradient (ft/ft)	Channel Dimensions: Bottom Width (ft)	Channel Dimensions: Bottom Grade (%)	Channel Dimensions: Depth of Flow (ft)	Channel Dimensions: Side Slopes	"n" Value Aged	"n" Value As Built	Velocities Aged	Velocities As Built	Excavation Cu. Yds.	Inventory of Ch. Work[1/] Type of Work	Type of Ch. Prior To Proj.	Flow Cond. Prior To Proj.
L-1ØØ	140+00 0+00	2.74	Estimated												25,200	II	M	E
L-1ØØ-1	25+00 0+00	0.20	Estimated												4,500	II	M	E
L-1ØØ-2	18+00 0+00	0.15	Estimated												3,240	II	M	E
L-1PP	116+00 0+00	1.66	Estimated												20,880	II	M	E
L-1QQ	46+00 0+00	0.31	Estimated												8,280	II	M	E
L-1RR	19+00 0+00	1.04	Estimated												3,420	II	M	E
L-1TT	104+00 0+00	2.94	Estimated												18,720	II	M	E

1/ See attached coding system for inventory of channel work.

June 1974

Coding System for Inventory of Channel Work

Type of Work	I -	establishment of new channel including necessary stabilization measures
	II -	enlargement or realignment of existing channel or stream
	III -	cleaning out natural or manmade channel (includes bar removal and major clearing and snagging operation)
	IV -	clearing and removal of loose debris within channel section
	V -	stabilization, by continuous treatment or treatment of localized problem areas, as primary purpose (present capacity adequate)
	VI -	adequate
Type of channel Prior to Project	N -	an unmodified, well-defined natural channel or stream
	M -	manmade ditch or previously modified channel
	O -	none or practically no defined channel
Flow Condition Prior to Project	Pr -	perennial - flows at all times except during extreme drought
	I -	intermittent - continuous flow through some seasons of the year but little or no flow through other seasons
	E -	ephemeral - flows only during periods of surface runoff
	S -	ponded water with no noticeable flow, caused by lack of outlet or high ground-water level

TABLE 3A - STRUCTURAL DATA
STRUCTURES FOR WATER CONTROL (WEIRS)
BAYOU PLAQUEMINE BRULE WATERSHED, LOUISIANA

CHANNEL	STATION 1/	ELEVATION OF HYDRAULIC GRADIENT (ft msl)	HEIGHT (ft)	CREST ELEV. (ft msl)	DEPTH (ft) 2/	CREST WIDTH (ft)	SIDE SLOPE	LENGTH (ft)
L-1B	343+00	11.0	2.8	5.5	5.5	68	2/1	106
L-1I-5	250+00	34.5	2.4	29.7	4.8	25	2/1	60
L-1I-9	1+00	32.4	2.8	27.5	4.9	28	2/1	64
L-1K	456+16	29.0	2.0	25.0	4.0	30	2/1	62
L-1L	9+00	16.2	2.9	10.4	5.8	29	2/1	68
L-1R	45+00	28.5	2.8	22.8	5.7	26	2/1	65
L-1R	121+00	31.2	2.5	26.1	5.1	28	2/1	64

1/ Locations of weirs are approximate. Final locations will be determined during construction stage.

2/ Difference between hydraulic gradient and crest elevations.

TABLE 4 - ANNUAL COST

Bayou Plaquemine Brule Watershed, Louisiana

(Dollars)1/

Evaluation Unit	Amortization of Installation Cost2/	Operation and Maintenance Cost3/	Total
I	39,700	15,400	55,100
II	19,300	3,200	22,500
III	37,900	13,000	50,900
IV	92,700	30,000	122,700
V	75,400	25,400	100,800
Project Administration	39,200	-	39,200
Grand Total	304,200	87,000	391,200

1/ Price base 1974.
2/ 50 years @ 5 5/8 percent interest.
3/ In addition to the $87,000 operation and maintenance cost for project channels, $75,000 is necessary to maintain the existing 126 miles of adequate channels downstream from the benefit area.

June 1974

TABLE 5 - ESTIMATED AVERAGE ANNUAL FLOOD DAMAGE REDUCTION BENEFITS

Bayou Plaquemine Brule Watershed, Louisiana

(Dollars)

Item	Estimated Average Annual Damage Without Project	Estimated Average Annual Damage With Project	Damage Reduction Benefits
Floodwater			
Crop and Pasture 1/	983,700	280,800	702,900
Nonagricultural 2/			
Residential	14,400	9,900	4,500
Commercial	36,700	6,100	30,600
Industrial	1,400	200	1,200
Road and Bridge	209,100	63,200	145,900
Subtotal	1,245,300	360,200	885,100
Indirect	77,400	22,700	54,700
Total	1,322,700	382,900	939,800

1/ Current normalized prices.
2/ Current prices.

June 1974

TABLE 6 - COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURES

Bayou Plaquemine Brule Watershed, Louisiana

(Dollars) 1/

Evaluation Unit	Average Annual Benefits						Average Annual Cost 2/	Benefit Cost Ratio
	Reduction	More Intensive Land Use	Drainage	Redevel-opment	Secondary	Total		
I	97,400	15,400	69,100	7,700	23,100	212,700	55,100	3.9:1
II	41,900	7,000	31,700	3,300	9,500	93,400	22,500	4.2:1
III	167,700	28,900	130,200	6,600	47,300	380,700	50,900	7.5:1
IV	280,600	46,200	207,900	16,100	63,400	614,200	122,700	5.0:1
V	352,200	58,600	264,000	14,800	70,200	759,800	100,800	7.5:1
Project Administration	xxx	xxx	xxx	xxx	xxx	xxx	39,200	
GRAND TOTAL	939,800	156,100	702,900	48,500	213,500	2,060,800	391,200	5.3:1

1/ Current normalized prices for crop and pasture; 1974 prices for all other values
2/ From table 4

June 1974

Land Treatment

The U.S. Department of Agriculture, under the leadership of the Soil Conservation Service, has published conservation needs inventories for Acadia and St. Landry Parishes. These inventories provided information on land capability subclasses by land use. Agricultural workers in the parishes supplied information on soils, land capability, and land use. This information along with technical guidance was used to develop land treatment needs for the watershed.

Conservation measures applied to date were determined from farm operators and from a study of field office records. This information was used in preparing table 1A.

Conservation measures to be applied during the installation period were determined after careful consideration of the following factors:

1. Basic needs of the watershed

2. Personnel available for planning in the field office

3. Experience gained from the installation of other projects

4. Interviews with farm operators regarding their resources, desires, and willingness to install needed land treatment measures.

Hydraulic and Hydrologic Investigations

Basic data was assembled from the following sources:

1. U.S. Coast and Geodetic Survey quadrangle maps

2. Aerial photographs

3. U.S. Environmental Data Service frequency analyses

4. Field surveys

5. U.S. Geological Survey and U.S. Army Engineers streamflow records

6. Field observation

7. General soil maps

8. Land use inventory

9. Fish and wildlife assessments

10. Special agency reports

11. Soil survey, Acadia Parish, Louisiana.

Hydraulic engineers measured the capacities of existing watershed channels for carrying storm runoff. Stage-discharge relationships were determined at regular intervals along each channel. These determinations on parts of Bayou Plaquemine Brule (M-1), Bayou Wikoff (L-1I), and Bayou Blanc (L-1E) were made by computing water surface profiles for a range of selected discharges.[1/] The smallest discharges selected were less than the design drainage flow and the largest exceeded the 100-year peak flow. Water surface profiles were also computed with simulated project conditions. Inputs for the computations were assembled from field survey data, field observations, and maps constructed from quadrangle sheets. The starting elevations for the computations on Bayou Plaquemine Brule near its junction with Bayou des Cannes, were determined from analyses previously made in the Southwest Louisiana River Basin Study.

Where water surface profiles were not computed, channel capacities were determined by the slope-area method. "Design" hydraulic gradients, or water surface profiles, were superimposed on the channel profiles at elevations above which prolonged flooding causes significant damages to crops. Channel reaches were deemed adequate where the measured capacities below the design gradients equaled the design flows.

Design flows for agricultural drainage were computed with the formula $Q = CM^{5/6}$, where Q is the required capacity in cubic feet per second, C is a coefficient related to level of protection, and M is the drainage area in square miles. Research and long-term observations by drainage engineers have verified the relationship between drainage area and required discharge. Recent research has identified the relationship between the coefficient and storm runoff volume.[2/] This relationship was applied to the runoff volume of a 3-year storm to

---

1/ The computations were done by IBM 1130 Computer. The program used the Doubt Method described in SCS NEH-5.

2/ "Using the Cypress Creek Formula to Estimate Runoff Rates in the Southern Coastal Plain and Adjacent Flatwoods Land Resource Areas." ARS 41-95, Agricultural Research Service, John C. Stephens and W. C. Mills, February 1965.

determine the required coefficient of 54 for cropland and 25 for forest. Project channels will reduce the frequency of significant damage to crops and pastures above the design gradient to an average of not more than once in 3 years. The peak flow from a 3-year storm will be out-of-banks, but the storm flow will not remain above the design gradient more than about 24 hours. Flooding of this duration will not cause significant crop and pasture damage.

The reduction in average annual damaging overbank flow to be brought about by project channels was determined by using a curve of proportional runoff volumes (ordinates) against probability. Proportional runoff volumes corresponding to FUTURE WITHOUT PROJECT and FUTURE WITH PROJECT probabilities of damaging overbank flooding were set as lower limits of areas under the curve. The areas represent average annual damaging overbank flow volumes and were assumed to be proportional to damages induced by water.

Land surfaces lower than the design gradients will flood more frequently and stay flooded longer than higher lands. The land use in the protected areas is predominantly crop and pasture; the land used in the unprotected areas is predominantly forest land or swamp. The flood risk in the unprotected areas will discourage clearing of forest land.

Channel work on Bayou Plaquemine Brule at Church Point was designed to reduce the average frequency of significant damages to existing homes, businesses, and other improvements to not more than once in 100 years. The adequacy of the designed channel was checked by computing water surface profiles for the 100-year peak flow.

The effect of channel work on downstream stages was computed at selected points. Increases in peak discharges were determined by routing storms of various frequencies, using FUTURE WITHOUT PROJECT and FUTURE WITH PROJECT watershed conditions.[3/] The peak discharges obtained with the routings were applied to the stage-discharge curves to obtain peak stages for comparison. The increases in stages are shown in EFFECTS OF WORKS OF IMPROVEMENT. The effects of all proposed or installed Public Law 566 watershed project measures in the drainage area of the Mermentau River were included in the computation of discharge and stage increases.

Engineering Investigations

The following studies were made to determine the structural measures which would be installed:

1. U.S. Geological Survey quadrangle maps were used as a base in preparing a planning map showing the watershed boundary,

---

3/ The routings were done by IBM 1130 Computer. The program is described in SCS Technical Release 20.

proposed channels, drainage patterns, systems of roads, and other pertinent data.

2. Floodwater retarding structures were considered. Investigations revealed one possible site. This structure is discussed in PROJECT FORMULATION as an alternative. No other sites are available because the topography does not lend itself to this type measure.

3. The Sponsors agreed upon the locations of channels they wished investigated.

4. Designs were made on these channels which would provide 1.5-year, 3-year, and 5-year levels of protection. Designs and cost estimates were developed for each of the three levels of protection.

5. Investigations were made on Bayou Plaquemine Brule in the vicinity of Church Point in order to minimize flood damage from the 100-year frequency flood.

6. The Sponsors chose to do work on Bayou Plaquemine Brule for only 3 miles near Church Point. Working the entire length of Bayou Plaquemine Brule would cause adverse effects to fish and wildlife and increase peak stages on Bayou Plaquemine Brule in the vicinity of Crowley. This would cause additional damages from floodwater during large storms.

7. The watershed was divided into several areas of priority based on the Sponsors' suggestions. The first priority is that area in greatest need of immediate attention. This is the area affected by 3 miles of M-1, Channels L-1I-8 through L-1I-12, Channels L-1P through L-1Y, and their tributaries. Sufficient surveys and designs to allow an invitation for bids and preparation of land rights maps were made for this area.

The following abbreviated survey procedure was used on the remaining areas:

Field surveys were made on a representative sample of the remaining channels. Designs and cost estimates for the planned measures of these surveyed channels were developed. Design flow for channel work was computed from general formulae as described under "Hydraulic and Hydrologic Investigations." Costs of the unsurveyed channels were estimated from relationships obtained for the surveyed channels in this watershed and other watersheds with similar characteristics. Grade stabilization structures were planned to prevent future channel erosion. One of these structures is to be placed in Channel L-1I-8A to control a drop in channel bottom elevation. The island method of construction will be used. Excessive flows will be diverted around the structure and will not overtop the embankments. The structure is designed to convey 150 percent of the drainage flow. Considered to be an integral part of the channel, it has a design life of 50 years. The other structures are to be installed in lateral

channels that drain into the portion of Channel M-1 that is to receive work. These structures will help to reduce channel erosion and protect Channel M-1 from excessive sedimentation, thereby reducing downstream turbidities and maintenance.

The design "n" values for "aged" channels range from .025 to .045, depending on the value of the hydraulic radius as shown in the following tabulation:

HYDRAULIC RADIUS	"n"
Less than 2.5	0.040 - 0.045
2.5 to 4.0	.035 - .040
4.0 to 5.0	.030 - .035
More than 5.0	.025 - .030

The "n" values for "as built" channels range from 0.020 to 0.025. All channels have been designed to meet the criteria for stability in Technical Release 25 taking into account allowable flow velocities in view of soil materials present.

The existing drainage system has been extended and modified periodically. However, only a small number of main channels have been dug in recent years. In areas where project channels will outlet through these old channels, the outlets were investigated to determine their stability. Channels were designed so that excavation will be terminated prior to entering erodible outlet sections. Outlet sections that are covered with natural vegetation and show no evidence of active erosion are considered safe and stable outlets for project channels as long as no additional drainage area is added to the channel.

Estimated unit costs of structural measures were based on the going rate of similar work in the general area, with adjustments for special conditions which exist. Land rights maps for all channels in the area of highest priority were prepared. Some locations of channels in the remaining priority areas will need to be made during the operations stage of the project.

The Sponsors furnished ownership information. The locations of the proposed channels were checked against the ownership map to eliminate channels benefiting only one ownership or resulting primarily in bringing new land into agricultural production.

After the land treatment measures and those structural measures needed for flood prevention and drainage has been determined, a table was developed which gave the cost of each measure. The summation of the total costs for all needed measures represents the estimated installation costs of the project (table 1). A second table was developed to show the annual costs of installation and operation and maintenance of the structural measures (table 4). Pertinent physical data for individual structural measures are summarized in table 3.

INVESTIGATIONS

Geologic Investigations

Channel Stability studies were conducted in accordance with accepted Soil Conservation Service procedure. Six locations were selected for soil sampling; three on each of two representative channels. Each location was hand-augered and logged, and representative soil samples were collected. These samples were analyzed for grain-size distribution, plasticity indices and dispersion characteristics. In samples from five of the locations, the materials were clays with plasticity indices greater than 10. In the one other location near Mowata Church, a ML or CL material was encountered with a plasticity index of 7. This material was at depths of 2 to 4 feet. Channels in this area were designed for velocities less than 3 feet per second. Past experience indicates that this velocity will not erode the material.

Materials encountered during the stability investigation were taken into consideration when costs of water control structures were estimated.

Sedimentation Investigations

Sheet erosion was calculated by use of the Musgrave Equation. This equation states that $E = FR \left(\frac{S}{10}\right)^{1.35} \left(\frac{L}{72.6}\right)^{.35} \left(\frac{P_{30}}{1.375}\right)^{1.75}$ where:

E = Sheet erosion, tons per acre per year
F = Soil factor, basic erosion rate in tons per acre per year for each soil series or unit
R = Cover factor
S = Slope
L = Length of land slope in feet
P_{30} = Maximum 30-minute, 2-year frequency rainfall in inches.

For a discussion on the background of this formula, see page 38 of "Applied Sedimentation," edited by P. D. Trask.4/

For purposes of computing sedimentation, each evaluation unit was analyzed separately. Present and projected land use was utilized in the analyses. This allowed a more definitive approach as to delivery ratios and downstream effects.

Present cover factors were based on observation and records of amounts and type of land treatment measures that had been applied. Future cover factors without project conditions were estimated according to the normal rate of application of land treatment measures. Future cover factors with project conditions were estimated according to the expected accelerated rate of application of land treatment measures. This will be accomplished by accelerated technical assistance.

4/ P. D. Trask, "Applied Sedimentation" (New York: John Wiley and Sons, Inc., 1950), p. 38.

INVESTIGATIONS

The sediment yields to specific points were calculated using a sediment delivery ratio that is a function of the drainage area. Its accuracy has been established through sedimentation surveys. Trap efficiencies of water control structures were calculated as functions of location and grain size as indicated by previous sedimentation surveys conducted by the Agricultural Research Service and the Soil Conservation Service.

Suspended sediment estimates were based on the average annual sediment rate and the average annual runoff. The amount of channel bank erosion which will occur due to construction was calculated as functions of type of material being disturbed, size of channel, methods of construction, and vegetative practices which are to be used in construction. A sequence of construction has been selected so that the reduction in sediment due to land treatment and structural measures will exceed the amount of erosion instigated by construction.

Ground Water and Mineral Investigations

These consisted of a review of pertinent literature.

Archaeological, Historic, and Scientific Investigations

Scanning the "National Register of Historic Places," written communications with the Curator of Anthropology of Louisiana State University, and oral communications with local historians provided the data for this section.

Fish and Wildlife Investigations

Biologists of the U.S. Fish and Wildlife Service, the Louisiana Wild Life and Fisheries Commission, and the Soil Conservation Service, working together as a team, made three field trips to the project area. In addition, Soil Conservation Service biologists made preliminary field investigations to gather basic biological data prior to the Soil Conservation Service submitting a request for planning authority. Soil Conservation Service biologists made several subsequent field trips to the project area to evaluate recommendations and obtain more detailed data concerning fish and wildlife. This data influenced estimates of present habitat types, conditions and population levels, and estimates of project effects on fish and wildlife. After the effects were determined, methods and ways to eliminate or minimize adverse effects were resolved. Of equal importance, ways to enhance beneficial effects were discussed. These recommendations for maintaining or improving fish and wildlife habitats were incorporated into this plan.

INVESTIGATIONS

Preproject fish and wildlife habitat conditions and population levels were determined by:

1. Data provided by the Louisiana Wild Life and Fisheries Commission

2. Field investigations

3. Review of available literature.

Postproject populations were estimated by Soil Conservation Service biologists, with concurrence by the Louisiana Wild Life and Fisheries Commission biologists, by an accounting of habitat changes because of project action and animal species population density of each major habitat type.

Estimates of preproject fish populations and species composition were supplemented by data obtained from two rotenone samples taken by biologists of Louisiana Wild Life and Fisheries Commission and a Soil Conservation Service biologist. These samples which encompassed 1 acre each were taken in Bayou Plaquemine Brule about 1½ miles downstream from Quebodaux Ferry in June 1973. Fish populations and habitat conditions will be monitored over a period of years in this and four other projects. This will establish better fish population data and any changes thereupon due to project installation.

An inventory of the quality, quantity, and types of wetland areas, lakes, ponds, and channels was made. Wetland types were classified according to the criteria set forth in USDI Circular No. 39. Effects of the project on each wetland type, lakes, ponds, and channels were determined and evaluated.

Water quality data was obtained from several different sources. Previously obtained water quality data was secured from unpublished data provided by the Division of Water Pollution Control of Louisiana Wild Life and Fisheries Commission and other available literature on the water quality of the area.

Eight sets of water samples (35 samples) were taken within the watershed from April 1973 to May 1974 for chemical analysis. Each set contained individual samples from each of three, four, or five sampling stations. All samples were taken by following the procedure described in the following discussion of the Monitoring Program. The water quality analysis of each sample was performed by at least one of three laboratories:

1. United States Department of the Interior - Geological Survey, Water Resources Division

2. Louisiana State University - Louisiana Agricultural Experiment Station, Feed and Fertilizer Laboratory

3. United States Department of Agriculture - Soil Conservation Service, Watershed Planning and River Basin Studies.

The Louisiana Agricultural Experiment Station Feed and Fertilizer Laboratory also ran tests for pesticide concentrations. The procedure used in collecting samples for pesticide tests is discussed in the description of the Monitoring Program below.

Additional pesticide data was obtained with a Pesticide Usage Survey made in 1973 by the Soil Conservation Service's district conservationist in the project area. Information on types of pesticides used, rates and methods of application, number of applications, and soil types for each major crop was obtained for at least 10 percent of the acreage in the watershed project area. This information was obtained from individual landowners. Each landowner was advised that his individual interview was confidential and that the data he provided would be used only to add to data obtained from other interviews and processed in order to obtain averages. As a check on the accuracy of the survey, local aerial application contractors were interviewed and asked the same questions.

The water quality monitoring program and pesticide usage surveys will be continued during and after installation of project measures. The monitoring and survey data will be used to further examine the relationships between project measures, pesticide usage, and water quality parameters such as pesticide residue levels.

MONITORING PROGRAM FOR SELECTED WATERSHED PROJECTS IN LOUISIANA TO DETERMINE PRECONSTRUCTION AND POSTCONSTRUCTION LEVELS OF PESTICIDES, FERTILIZER NUTRIENTS, AND OTHER WATER QUALITY PARAMETERS

Objective:

To monitor preconstruction and postconstruction levels of pesticides, nutrients, and other water quality data in five watershed projects (Public Law 566) in Louisiana. Results from the Monitoring Program will be used to more fully evaluate the impacts of the watershed program.

Watershed Projects Involved:

1. Four projects will be sampled for preconstruction and postconstruction conditions. They are Bayou Bonne Idee, East Franklin, Lake Verret, and Bayou Plaquemine Brule.

2. Duralde-des Cannes Watershed project will be sampled only for postconstruction levels.

Procedure:

1. Time Frame: Two years of preconstruction data will be collected for four projects and 5 years of postconstruction data for five projects.

2. Sampling: Water, bottom sediment, and fish samples will be collected. Samples will be taken in the major drainage outlets in each project. Sampling stations will be located in the lower, middle, and upper reaches of the major outlet. Sample locations will be unchanged for the duration of the study. Three to five permanent sampling locations per watershed project will be used. Collection of samples will be twice yearly during May through June and October through November.

   The Soil Conservation Service will have primary responsibility for collecting samples, with representatives from the Louisiana Wild Life and Fisheries Commission and the U.S. Fish and Wildlife Service participating as these agencies' workloads permit. The Feeds and Fertilizer Laboratory, Louisiana Agricultural Experiment Station, Louisiana State University, Baton Rouge, will conduct laboratory analyses of the samples. The Department of Experimental Statistics at Louisiana State University suggested collecting two samples of water, sediment, and fish at each station. This should increase sample variability with small additional effort thereby increasing the accuracy of the final statistical analysis. After 1 year, a decision will be made whether to continue dual sampling or revert to taking one sample per station.

   Fish samples will be collected with an electrofishing unit or rotenone. If possible, bass, bream, and shad will be collected at each sampling location. If these species are unobtainable, whatever species are obtainable will be used. Fish will be dressed, wrapped in aluminum foil, placed on ice, and delivered to the laboratory at Louisiana State University. All fish samples will be analyzed for pesticides in ppm.

   Bottom sediment samples will be collected with a Peterson Dredge. Approximately 5 inches of bottom sediment are obtained with this dredge. The samples will be placed in glass containers and analyzed at the laboratory for pesticides, nitrogen, and phosphorus.

Water samples will be taken at the surface using glass containers. The laboratory will analyze the water samples for pesticides, total hardness, percent nitrogen, phosphorus, and pH. Soil Conservation Service biologists will check oxygen, pH, apparent color, hardness, orthophosphate, suspended solids, turbidity, sulfides, sulfates, ammonia and nitrate nitrogen, and temperature at the time of collection with a Hach DR/2 Spectrophotometer.

The land use in drainage areas above each sampling station will be determined and monitored for changes. Pesticide types, amounts, and methods of application will be determined from landowners and flying service personnel (Pesticide Usage Survey).

Cooperation:

The Louisiana Agricultural Experiment Station will make the laboratory analysis of the samples. The Soil Conservation Service will have responsibility for collecting the samples. The Louisiana Wild Life and Fisheries Commission, U.S. Fish and Wildlife Service, and the Department of Experimental Statistics at Louisiana State University will assist in study procedures. The State and Federal fish and game agencies will assist in the collection of samples in the field as their schedules permit. Analyses of samples will be reviewed periodically with Louisiana Wild Life and Fisheries Commission and the U.S. Fish and Wildlife Service to evaluate the adequacy of the program.

Reports:

An interim report will be prepared by the Soil Conservation Service at the end of each year for in-service use. The final report will be prepared jointly by the Louisiana Agricultural Experiment Station and the Soil Conservation Service.

Economic Investigations

The following data were developed:

1. Estimated yields and production costs for crops and pasture grown under various conditions

2. Land use and production under future conditions both without and with the project

3. Associated costs induced by the project

4. Flood damage reduction to crop and pasture because of the project

5. Flood damage reduction to the town of Church Point because of the project

6. Increased returns because of increased quality of products

7. Reduction in crop production cost because of the project

8. Road and bridge damage reduction because of the project

9. Secondary benefits stemming from or induced by the project.

Basic data were obtained from residents of Church Point, Crowley, local farmers, agricultural workers, parish officials, experiment stations, other published and unpublished agricultural information, the 1970 U.S. Census of Population, and the 1969 Census of Agriculture. Parish statistics used were considered representative of the watershed.

The watershed was divided into five evaluation units with hydrologically independent water problems. The Project Map (Figure 8), has the evaluation units delineated on it. Evaluation Unit IV includes Church Point. The evaluation of channel work for urban flood protection in Church Point indicates a benefit-cost ratio of 1.4 to 1. Economic effects of project measures in each unit were evaluated separately from the other units. Procedures prescribed in the Economics Guide were used in the evaluation.

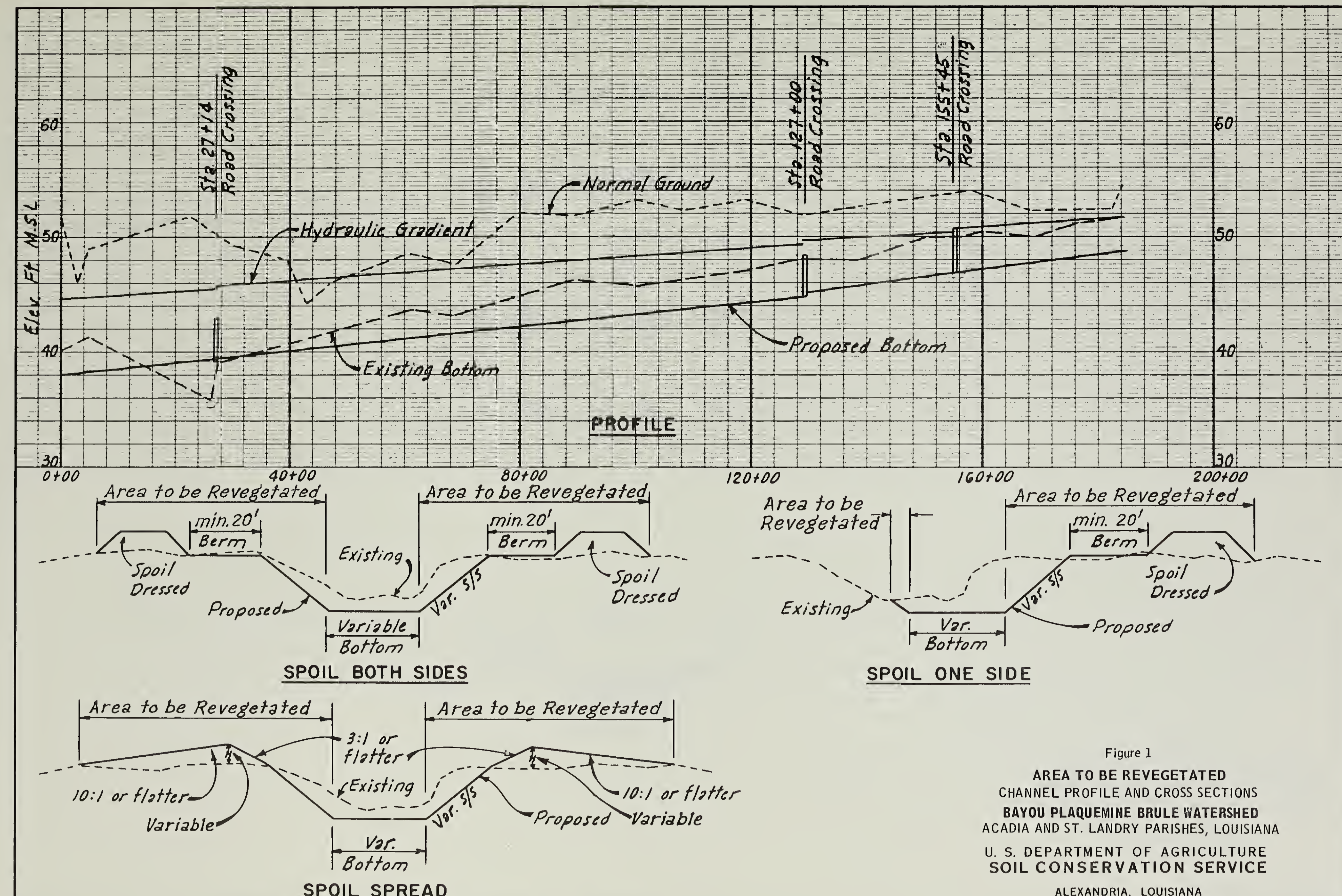


Figure 1

AREA TO BE REVEGETATED

CHANNEL PROFILE AND CROSS SECTIONS

BAYOU PLAQUEMINE BRULE WATERSHED

ACADIA AND ST. LANDRY PARISHES, LOUISIANA

U. S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

ALEXANDRIA, LOUISIANA

SEPTEMBER 1974 4-R-34,323

USDA-SCS-FORT WORTH, TEX. 1974

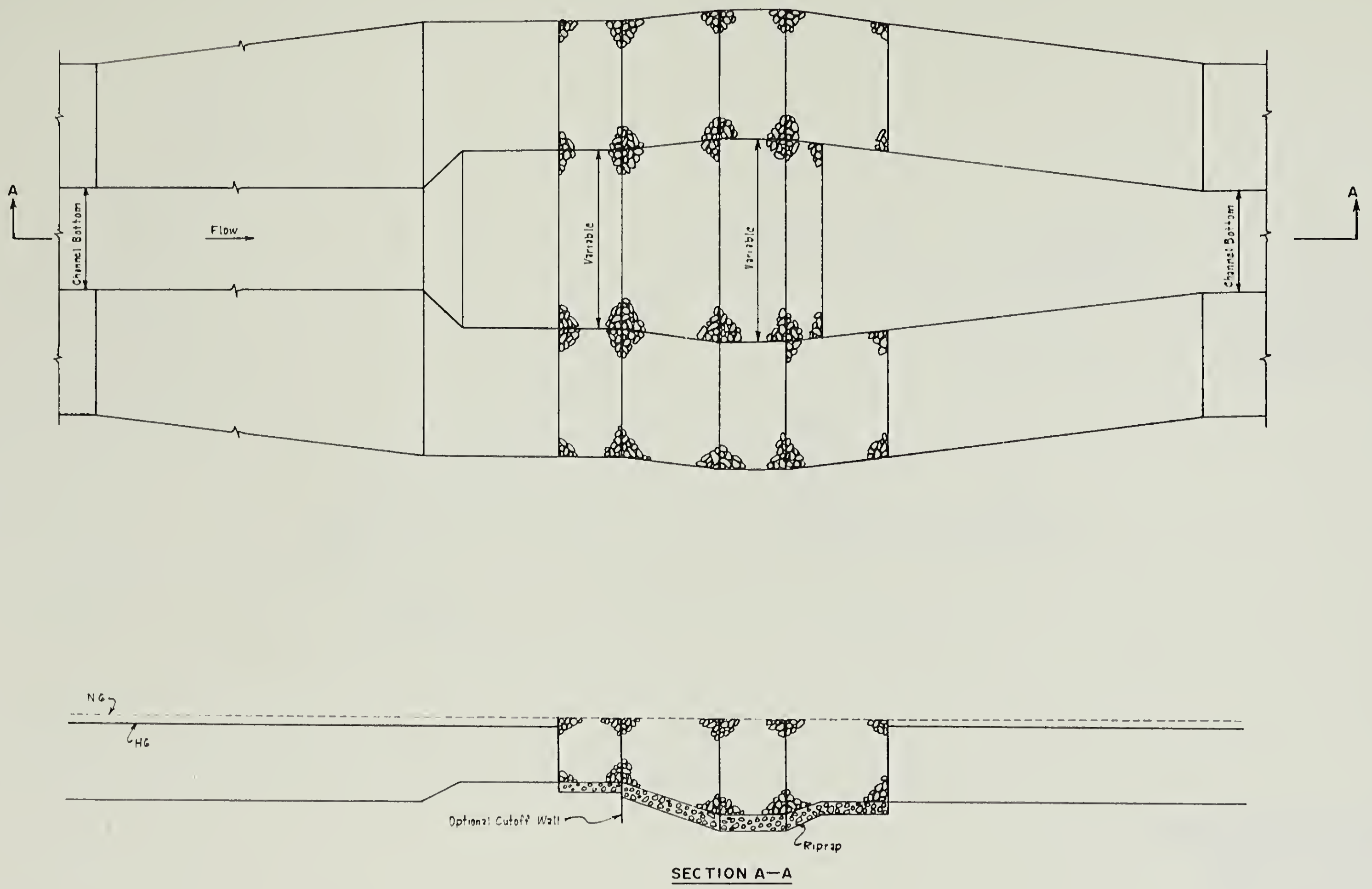


Figure 2

STRUCTURE FOR WATER CONTROL (WEIR)

BAYOU PLAQUEMINE BRULE WATERSHED

ACADIA AND ST. LANDRY PARISHES, LOUISIANA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ALEXANDRIA LOUISIANA

MARCH 1974 4–R–33803

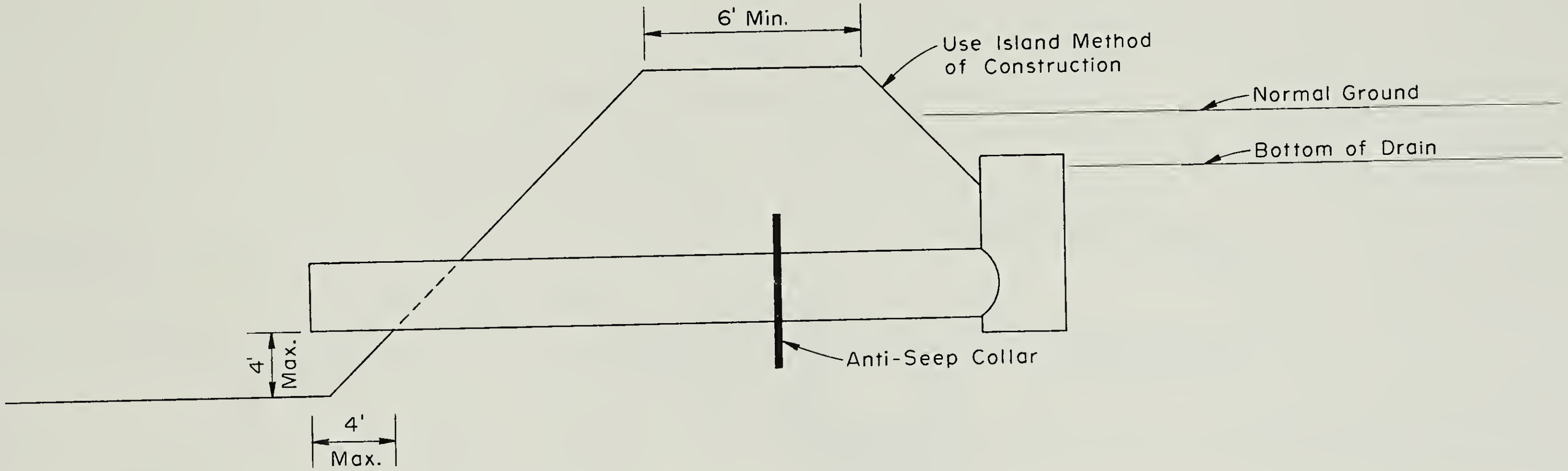
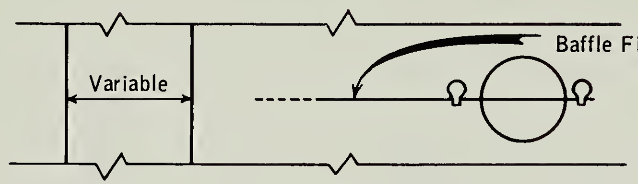


Figure 3

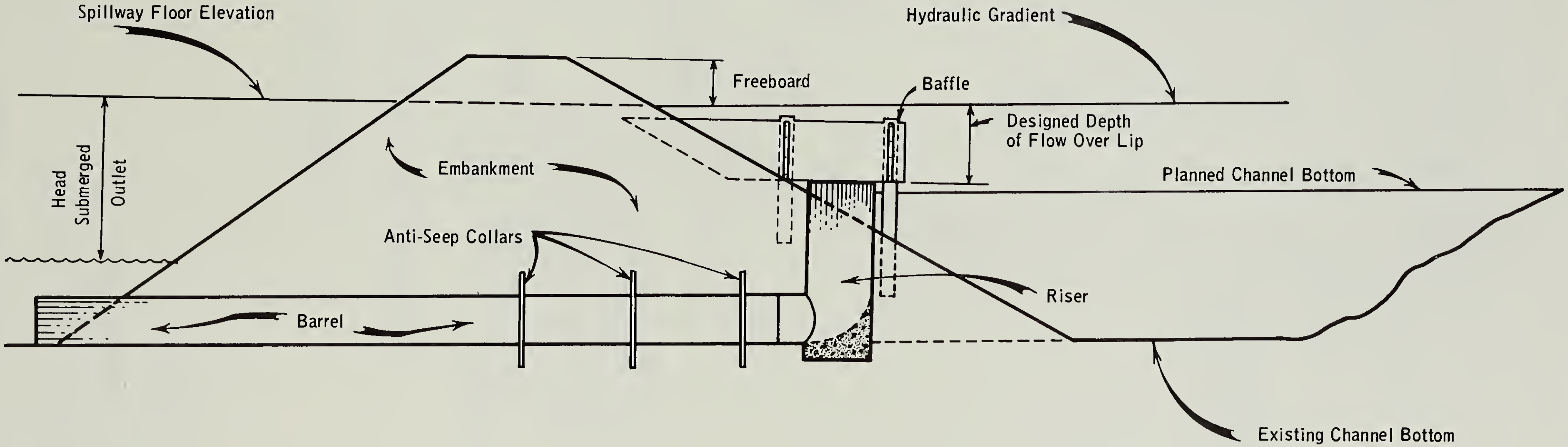
TYPICAL STRUCTURE FOR WATER CONTROL (PIPE DROP)
BAYOU PLAQUEMINE BRULE WATERSHED
ACADIA AND ST. LANDRY PARISHES, LOUISIANA
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ALEXANDRIA, LOUISIANA

MARCH 1974 4-R-33804

USDA-SCS-FORT WORTH, TEX 1974



PLAN VIEW OF BAFFLE AND RISER



SECTION VIEW

Figure 4

TYPICAL GRADE STABILIZATION STRUCTURE

BAYOU PLAQUEMINE BRULE WATERSHED

ACADIA AND ST. LANDRY PARISHES, LOUISIANA

U. S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

ALEXANDRIA, LOUISIANA 7-74 4-R-34,153

USDA SCS FORT WORTH TEX 1974

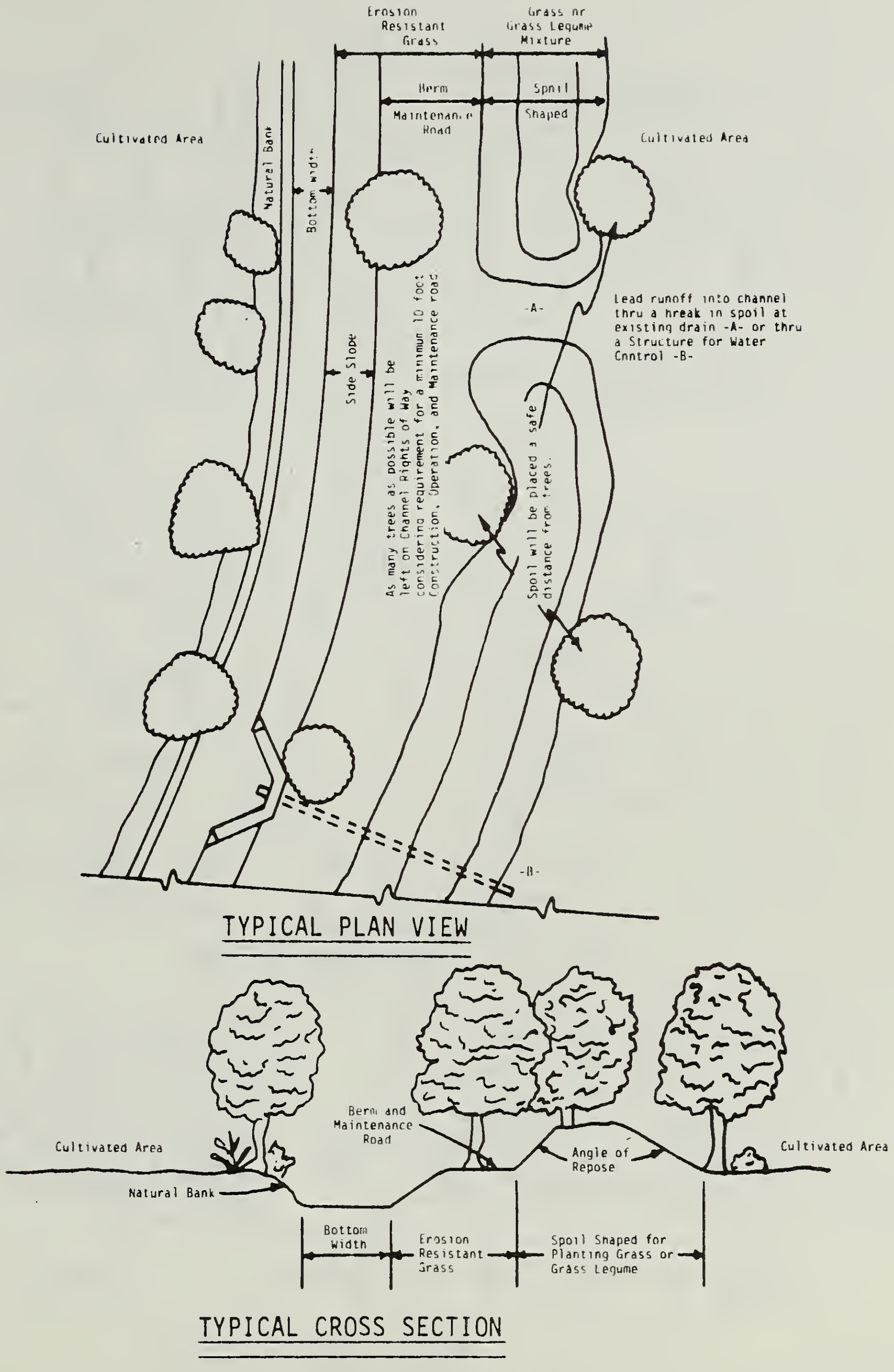


FIGURE 5

BAYOU PLAQUEMINE BRULE WATERSHED

Acadia and St. Landry Parishes, La.

TYPICAL PLAN VIEW AND CROSS SECTION OF CHANNELS WHERE WOODY VEGETATION EXISTS ADJACENT TO CULTIVATED AREA

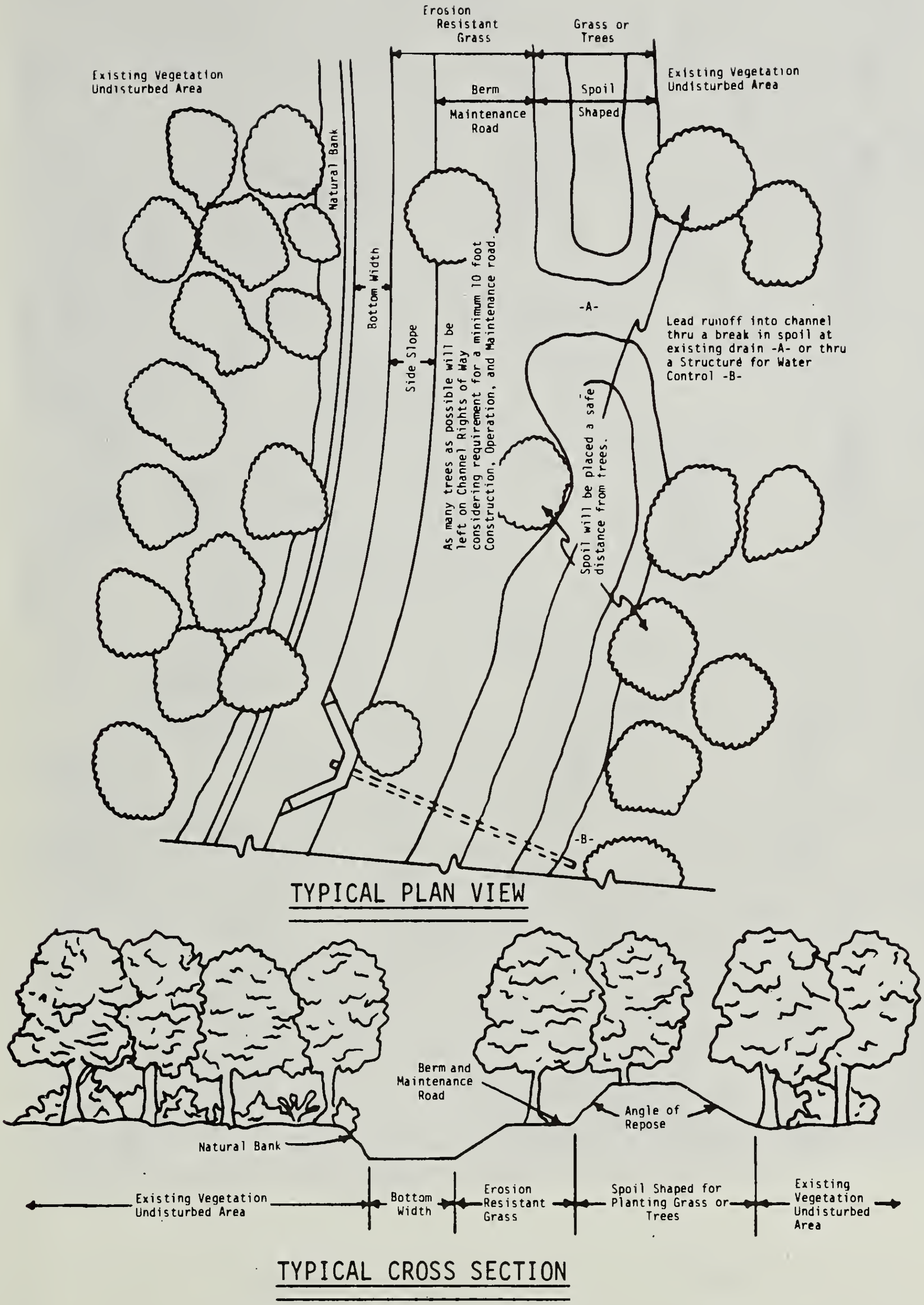


FIGURE 6

BAYOU PLAQUEMINE BRULE WATERSHED

Acadia and St. Landry Parishes, La.

TYPICAL PLAN VIEW AND CROSS SECTION OF CHANNELS THROUGH FOREST LAND

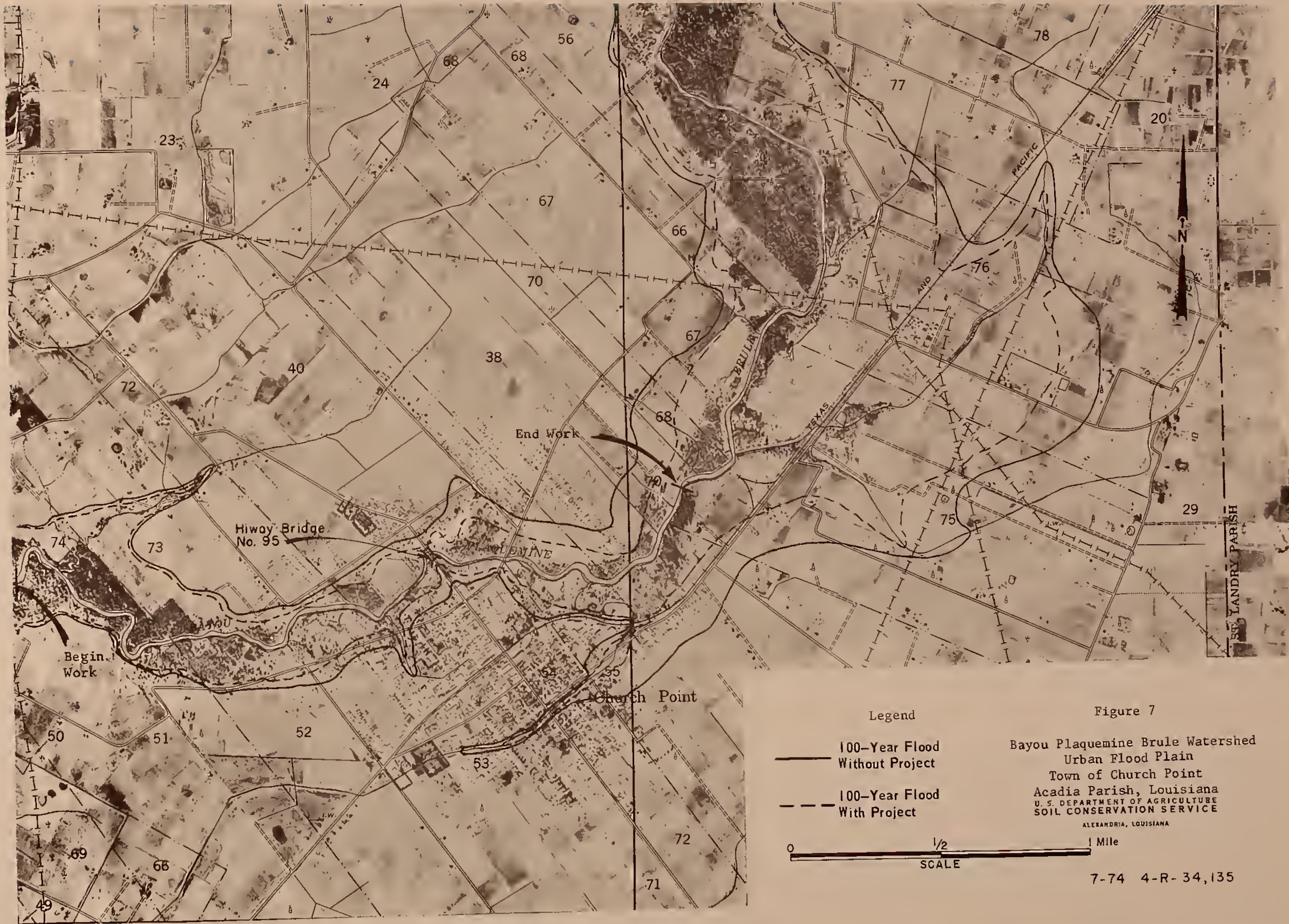
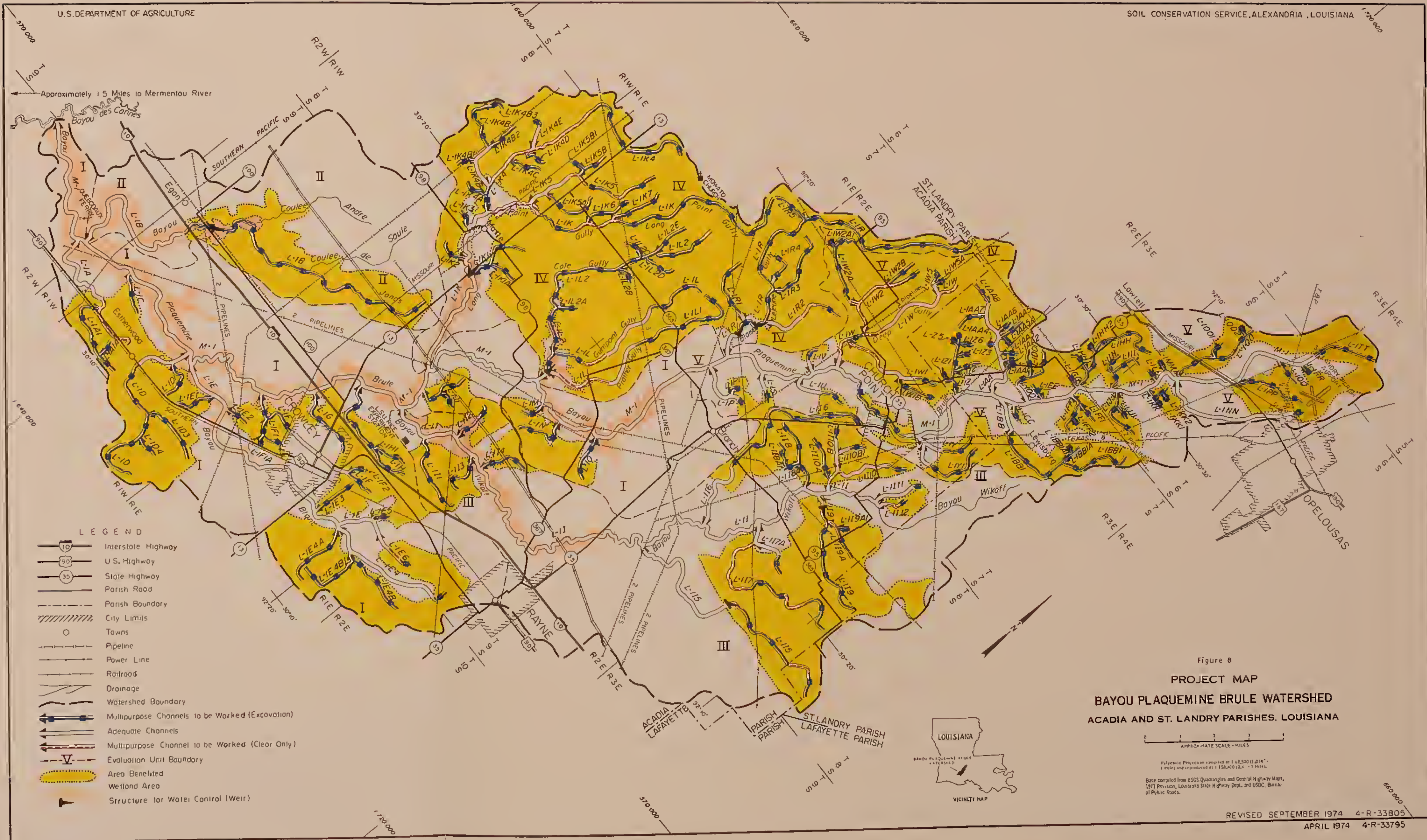


Figure 7

Bayou Plaquemine Brule Watershed
Urban Flood Plain
Town of Church Point
Acadia Parish, Louisiana
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ALEXANDRIA, LOUISIANA

7-74 4-R-34,135



U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE, ALEXANDRIA, LOUISIANA
Approximately 1.5 Miles to Mermentau River
Bayou des Cannes
SOUTHERN PACIFIC
MISSOURI PACIFIC
TEXAS & PACIFIC
CROWLEY
RAYNE
CHURCH POINT
OPELOUSAS
Lewisburg
Lowell
Egan
Bayou Plaquemine Brule
Coulee des Jonas
Coulee Andre
Bayou Wikoff
Bayou Bonco
Long Point Gully
Cole Gully
Gum Point Gully
Deep Gully
ST. LANDRY PARISH
ACADIA PARISH
LAFAYETTE PARISH
2 PIPELINES
LEGEND
Interstate Highway
U.S. Highway
State Highway
Parish Road
Parish Boundary
City Limits
Towns
Pipeline
Power Line
Railroad
Drainage
Watershed Boundary
Multipurpose Channels to be Worked (Excavation)
Adequate Channels
Multipurpose Channel to be Worked (Clear Only)
Evaluation Unit Boundary
Area Benefited
Wetland Area
Structure for Water Control (Weir)
LOUISIANA
VICINITY MAP
APPROXIMATE SCALE - MILES
Figure 8
PROJECT MAP
BAYOU PLAQUEMINE BRULE WATERSHED
ACADIA AND ST. LANDRY PARISHES, LOUISIANA
REVISED SEPTEMBER 1974 4-R-33805
APRIL 1974 4-R-33795